ATLAS
OF FISH LARVAE OF THE SOUTHERN OCEAN

by

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The material was collected during ten cruises of the «Akademik Knipovich» in the Scotia, «Lazarev»(2) and Bellingshausen Seas in August-May 1967-1981. The material was collected and treated according to standard procedures (Rass and Kazanova, 1966). The gear used was a Bogorov-Rass reverse-cone ichthyoplankton net (BR-80 x 113).

To identify the larvae, a series of post-larvae to pre-larvae were selected for each species. The species was identified from the oldest larva in the series, with primary attention given to the meristic characteristics : the number of myotomes, vertebrae and fin rays. To improve the accuracy of meristic data, the more advanced larvae and post-larvae were stained with alizarine according to Yakubovsky (1970). In the descriptions, the phases and stages of development are given according to T.S. Rass (1949, 1972) (3) and the following symbols are used : SL, standard length; pA, distance from end of snout to insertion of anal fin or pre-anal length; HL, head length; pO, snout length or pre-orbital length; O, eye diameter; H, body depth at anus level; h, depth of caudal peduncle; D, A, P, V, ray numbers in dorsal, anal, pectoral and ventral fins.

When describing larvae, post-larvae or juveniles of one given species, the descriptions of anatomical parts (like eyes, gut, urostyle, etc...) are not repeated from one stage to another, if nothing has changed.

The larvae of thirty-six species from the families Bathylagidae, Paralepididae, Myctophidae, Muraenolepidae, Macrouridae, Nototheniidae, Harpagiferidae, Bathydraconidae, Channichthyidae and Liparidae have been identified and are described.

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(2) «Lazarev Sea» is not a recognised place name. It is the sea adjacent to Queen Maud Land. (Ed.).

(3) In this Atlas, the author uses a «larval» nomenclature different of the one recommended during the workshop held in Paris : pre-larva = larva, larva = post-larva, post-larva = juvenile. (Ed.).

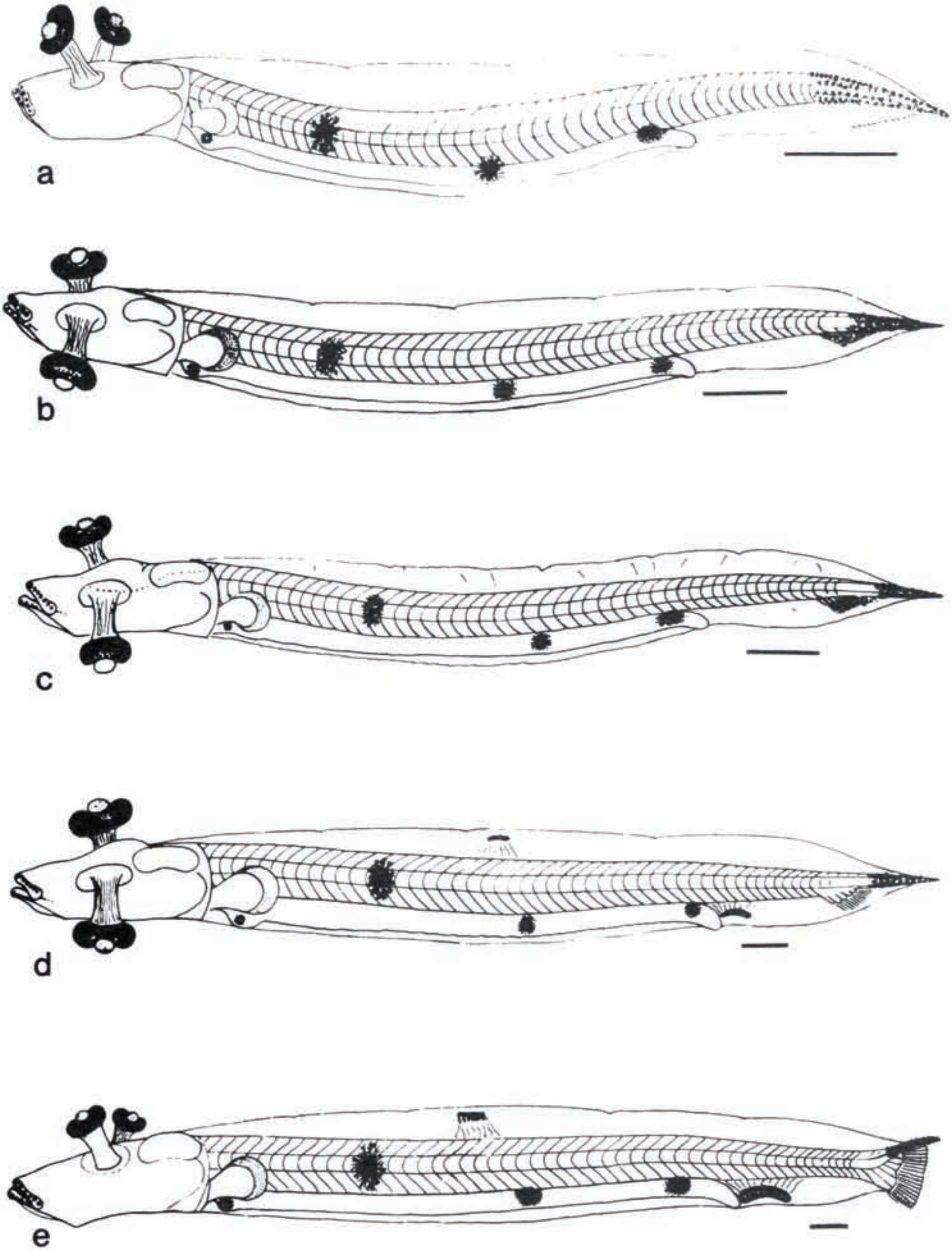

Fig. 1. – ***Bathylagus antarcticus*** : a - 7.5 mm larva, b - 10.7 mm larva, c - 15.0 mm larva, d - 18.0 mm larva, e - 26.5 mm larva.

BATHYLAGIDAE

The family Bathylagidae is represented by one species, *Bathylagus antarcticus* Günther, 7.5-26.5 mm in length, caught in the Scotia, «Lazarev» and Bellinghausen Seas south of the Antarctic Convergence during the period August to May (Fig. 1).

Bathylagus antarcticus Günther, 1878, (Fig. 1)

B. antarcticus, 7.5-9.5 mm (Fig. 1a)

The body is slender, not deep. H:4.0-5.2 % SL. The head is large, the snout protracted. HL:16.0-21.5 % SL, pO:27.7-33.5 % HL. Eyes on long stalks, O:15.2-18.5% HL. The gut is long, tube-shaped. pA:71.5-75.7 % SL. The larvae are slightly pigmented. There are three pigment cells on either side of the gut, one large pigment cell on either side of the body, concentrations of small pigment cells around the urostyle and on the edges of the jaw. Total myotomes, 48-50; trunk myotomes, 36-38. The body is fringed by a fairly low fin fold. The urostyle is straight.

B. antarcticus, 10.7-14.0 mm (Fig. 1b)

H:4.2-5.3 % SL. HL:18.6-21.3 % SL. pO:28.5-32.2 % HL. O:15.6-18.2 % HL. pA:71.3-74.0 % SL. Pigmentation, fin fold and urostyle unchanged. Total myotomes, 48-50; trunk myotomes, 38-39.

B. antarcticus, 15.0-17.3 mm (Fig. 1c)

H:5.3-5.7 % SL. HL:20.2-21.3 % SL. pO:31.2-34.3 % HL. Eyes are oval, on stalks, O:14.2-15.6 % HL. pA:72.3-74.0 % SL. Pigmentation, fin fold and urostyle unchanged. There are rudiments of four hypurals below the urostyle.

B. antarcticus, 18.5 mm (Fig. 1d)

H:6.5 % SL. HL:22.2 % SL. pO:31.7 % HL. O:14.6 % HL. pA:78.3 % SL. Pigmentation, fin fold and urostyle unchanged. Total myotomes, 51; trunk myotomes, 40. Below the urostyle are seven completely formed hypurals and rudiments of caudal fin rays. There are rudiments of dorsal and anal fins.

B. antarcticus, 26.5 mm (Fig. 1e)

H:5.6 % SL. HL:22.7 % SL. pO+40.0 % HL. O:14.5 % HL. The gut is shaped as a long tube of the same diameter along its full length. pA:78.7 % SL. The pectoral fins are fan-shaped. Pigmentation and fin fold unchanged. Total myotomes, 52; trunk myotomes, 40. The urostyle is upturned, the tip protruding outward. Rudiments of dorsal and anal fins appear on fin fold as compact bands on pedicles.

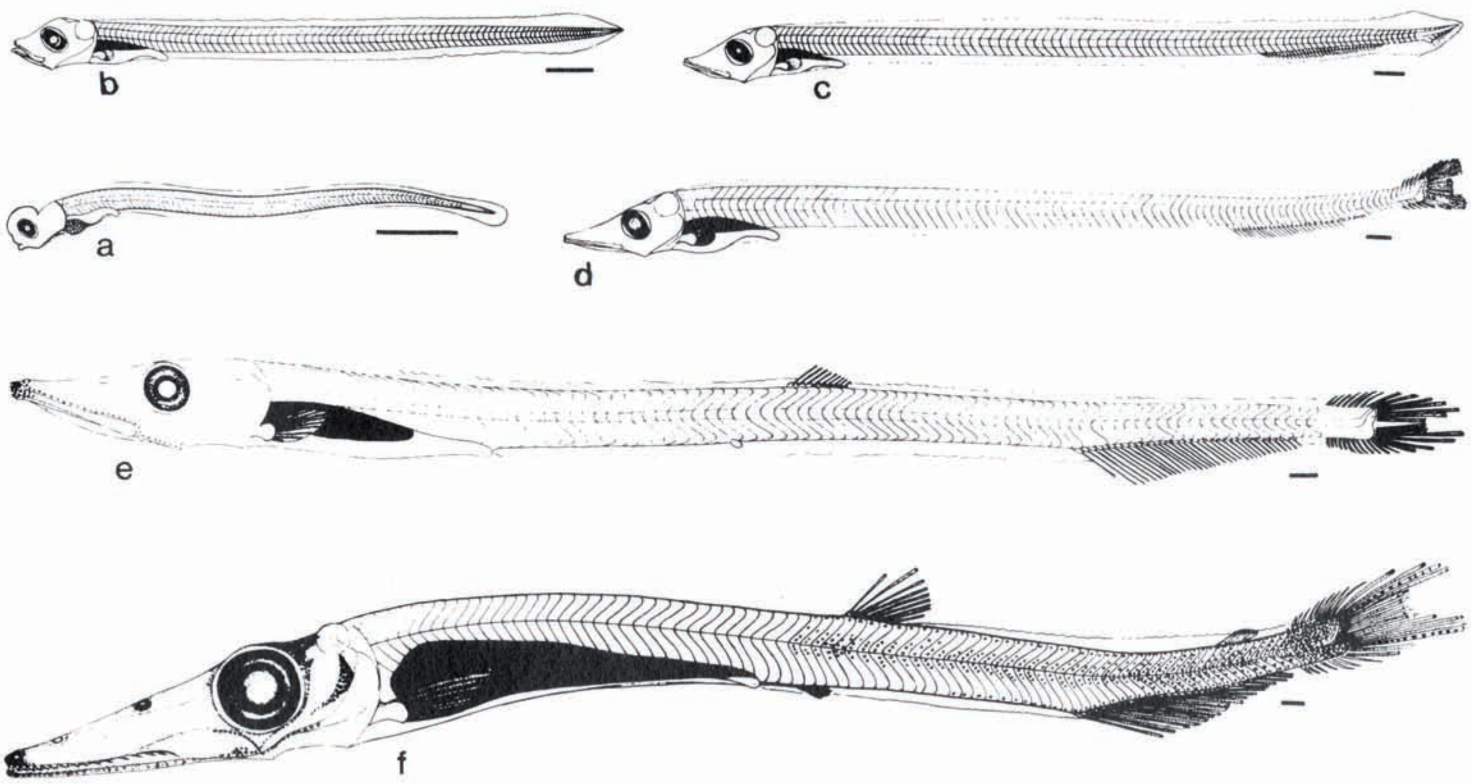

Fig. 2. – *Notolepis coatsi* : a - 6.5 mm larva , b - 14.5 mm larva, c - 26.5 mm larva, d - 33.5 mm larva, e - 60.5 mm larva, f - 68.5 mm larva.

PARALEPIDIDAE

The family Paralepididae is represented by one species, *Notolepis coatsi* Dollo, 5.5-68.5 mm in length, caught in the Scotia, Bellingshausen and «Lazarev» Seas south of the Antarctic Convergence during August to May (Fig. 2).

Notolepis coatsi Dollo, 1908, (Fig. 2)

N. coatsi, 5.5-6.5 mm (Fig. 2a)

The body is long and narrow, H:4.6-5.3 % SL. HL:17.2-17.6 % SL. The eyes are oval, O:42.8-50.0 % HL. The gut is short, with a swollen mid-section. pA:26.2-28.5 % SL. The larvae are not pigmented. Total myotomes, 83-85; trunk myotomes, 8-10. The body is surrounded by a low fin fold. The urostyles is straight.

N. coatsi, 10.5-14.5 mm (Fig. 2b)

The body is long and narrow. H:3.8-4.8 % SL. The head is small with an elongatedpointed snout. HL:12.2-13.6 % SL. pO:35.5-44.5 % HL. O:18.8-20.5 % HL. The gut is short, with a swollen mid-section. pA:23.8-25.5 % SL. The larvae are not pigmented apart from one area on the gut. Total myotomes, 85-87; trunk myotomes, 10-12. Fin fold and urostyle unchanged. Below the urostyle is a concentration of mesenchyme.

N. coatsi, 28.5-32.5 mm (Fig. 2c)

H:3.8-4.2 % SL. HL:10.5-13.2 % SL. pO:46.8-50.5 HL. O:20.5-22.0 % HL. The gut is short and the mid-section is swollen. pA:20.5-21.5 % SL. Pigmentation and fin fold unchanged. Total myotomes, 86-88; trunk myotomes, 10-12. Pterygophores and rudiments of rays in the anal fin are present. Hypurals and rudimentary rays in the caudal fin are present.

N. coatsi, 33.5-36.6 mm (Fig. 2d)

H:4.2-4.3 % SL. HL:14.2-15.4 % SL. O:45.5-46.8 % HL. The eyes are oval-shaped, O:16.5-18.8 % HL. pA:24.5-26.2 % SL. Pigmentation and fin fold unchanged. Total myotomes, 86-88; trunk myotomes, 12-14. The urostyle is upturned. Anal fin rays present, A:22-24. Caudal fin rays are completely formed.

N. coatsi, 60.5-62.5 mm (Fig. 2e)

The body is long and low. H:3.4-4.5 % SL. The head has an elongated snout. HL:15.5-18.5 % SL. O:50.5-50.8 % HL. The eyes are round, O:20.5-23.0 % HL. pA:25.0-30.0 % SL. The depth of the caudal peduncle H:1.5-1.8 % SL. Pigmenta-

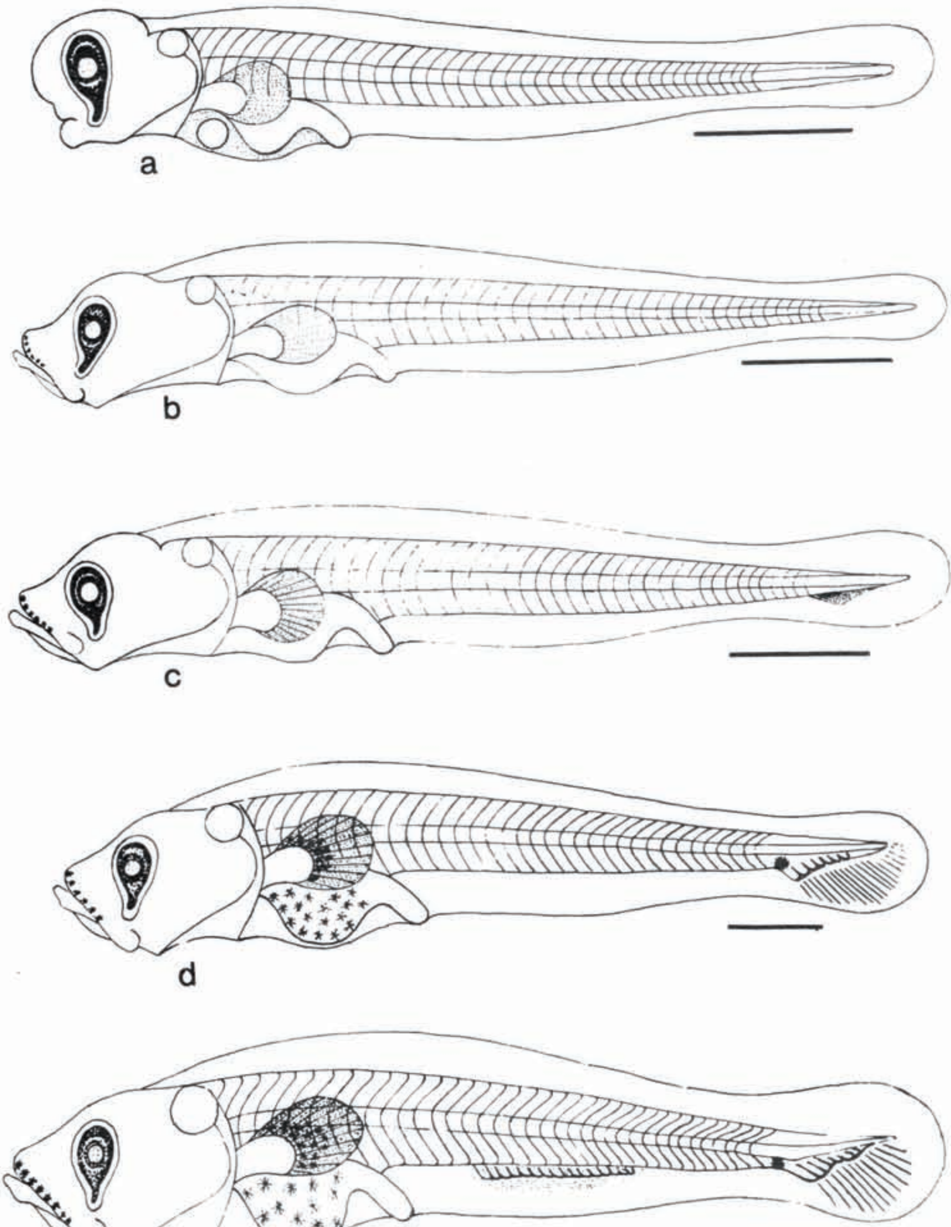

Fig. 3 a-e. – *Electrona antarctica* : a - 5.3 mm larva, b - 6.5 mm larva, c - 7.5 mm larva, d - 8.6 mm larva, e - 9.5 mm larva.

tion and urostyle unchanged. Total myotomes, 85-88; trunk myotomes, 12-14. The urostyle is upturned. Fin rays are completely formed, D:8-9, A:25-30, P:8-9.

N. coatsi, 68.0-68.6 mm (Fig. 2f)

The body is long and low. H:4.8-5.0 % SL. HL:25.4-25.5 % SL. O:55.5-60.0 % HL. The eyes are round, O : 17.6-18.2 % HL. Pigmentation has increased, pigment cells appearing along the bases of the anal, dorsal and caudal fin rays, as well as on fin rays. Small pigment cells have also developed on the sides of the caudal peduncle, occipital region and along the edges of opercula and jaws. Total myotomes, 88-89; trunk myotomes, 24-25. D:8-9, A:25-30, P:8-9.

MYCTOPHIDAE

The family Myctophidae is represented by larvae of 4 species: *Electrona antarctica* (Günther), *Krefftichthys anderssoni* (Lönnberg), *Gymnoscopelus braueri* (Lönnberg) and *Gymnoscopelus opisthopterus* Fraser-Brunner caught in the Scotia, Bellingshausen and «Lazarev» Seas south of the Antarctic Convergence during August-May.

Electrona antarctica. (Günther, 1878), (Fig. 3)

E. antarctica, 4.8-5.3 mm (Fig. 3a)

The body is slender, not deep. H:3.8-6.0 % SL. HL:10.2-16.6 % SL. The eyes are oval with a cone-like extension (drop-shaped), O : 22.2-25.5 % HL. The gut is short, the mid-section is swollen. pA:30.7-37.7 % SL. Residues of yolk sac and the oil globule are present. No pigmentation. Total myotomes, 38-39; trunk myotomes, 8-10. The body is fringed by a low fin fold.

E. antarctica, 6.5-7.0 mm (Fig. 3b)

H:6.3-7.5 % SL. HL:19.0-21.5 % SL, pO :21.4-23.0 % HL. O:21.4-23.0 % HL. Gut and fin fold unchanged. pA: 38.1-41.5 SL. Pigmentation is present as small pigment cells along the edge of the upper jaw. Total myotomes, 38-39; trunk myotomes, 8-10.

E. antarctica, 7.5-7.8 mm (Fig. 3c)

H:8.5-9.3 % SL. HL:21.3-26.7 % SL. O :18.7-20.0 % HL, O :18.7-20.0 % HL. Eyes and gut unchanged. pA: 41.3-42,6 % SL. Pigmentation remains unchanged. The urostyle is straight with a concentration of mesenchyme below. Total myotomes, 38-39; trunk myotomes, 8-10.

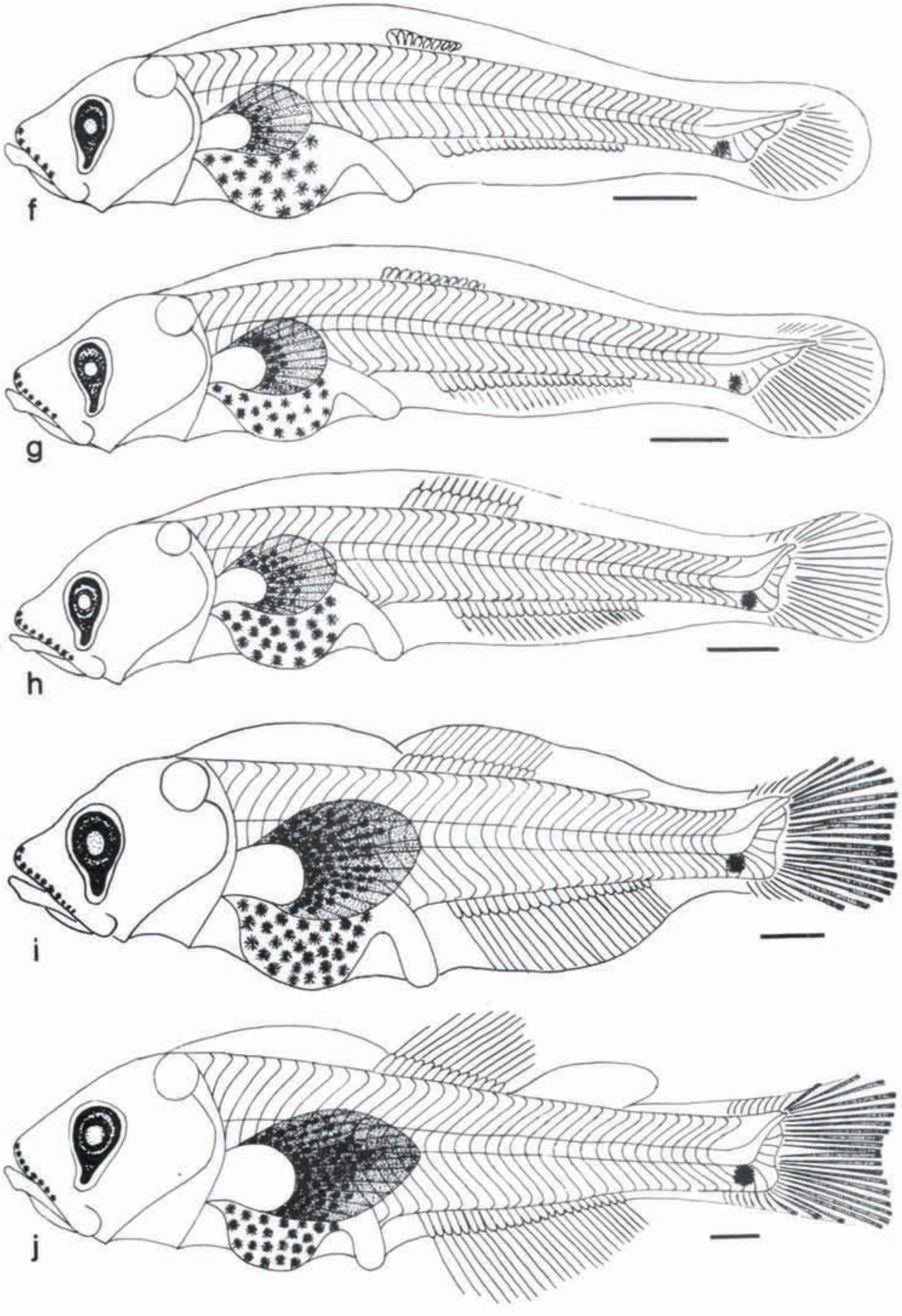

Fig. 3 f-j. – *Electrona antarctica* : f - 10.5 mm larva, g - 12.5 mm larva, h - 14.2 mm larva, i - 15.0 mm larva, j - 19.5 mm larva.

E. antarctica, 8.6-8.8 mm (Fig. 3d)

F: 8.3-9.7 % SL. HL:19.0-23.5 % SL. pA: 42.3-43.9 % SL. Total number of myotomes, 38-39; trunk myotomes, 11-12. Pigmentation is present as concentrations of pigment cells along the edge of the upper jaw, on the swollen part of the gut and on pectoral fin rays. There is one pigment cell below the urostyle. Rudiments of five hypurals are present in the caudal fin.

E. antarctica, 9.2-9.8 mm (Fig. 3e)

H:9.3-11.3 % SL. HL:23.8-26.2 % SL. pO :25.0-27.2 % HL. O :17.3-18.8 % HL. The gut is short, swollen at mid-length. pA:42.8-48.8 % SL. Total myotomes, 38-39; trunk myotomes, 10-12. Pigmentation and gut remain unchanged. The urostyle is upturned. Rudiments of pterygophores present in the anal fin.

E. antarctica, 10.5-11.0 mm (Fig. 3f)

H:11.4-13.5 % SL. HL:23.8-24.7 % SL. O :26.0-28.0 % HL. O :19.2-21.7 % HL. pA:45.7-47.0 % SL. Pigmentation remains unchanged. There are rudiments of pterygophores in the anal and dorsal fins and rudiments of rays in the caudal fin.

E. antarctica, 12.5-13.5 mm (Fig. 3g)

H:12.7-13.5 % SL. HL: 26.7-29.5 % SL. pO :26.6-32.2 % HL. O :15.6-16.6 % HL. pA:48.0-50.0 % SL. Pigmentation remains unchanged. There are rudiments of rays in the anal fin.

E. antarctica, 14.2-14.6 mm (Fig. 3h)

H:18.7-20.0 % SL. HL: 27.3-28.6 % SL. pO : 28.5-34.2 % HL. O : 15.6-17.0 % HL. pA: 50.7-54.4 % SL. Pigmentation remains unchanged. Rudiments of rays in the anal and dorsal fins are present. The caudal fin rays are completely formed.

E. antarctica, 15.0-18.5 mm (Fig. 3i)

H:16.3-19.3 SL. HL: 26.6-28.0 % SL. pO: 30.5-32.5 % HL. O :16.6-18.4 % HL. pA: 56.9-59.3 % SL. Total myotomes, 38-39; trunk myotomes, 12-14. Pigmentation remains unchanged. Fin rays are completely formed. D :10-12, A:19-20, P:12-13. Adipose fin is present. Residual fin fold is present.

E. antarctica, 19.0-20.9 mm (Fig. 3j)

The body is relatively deep. H:18.3-19.5 % SL. HL: 27.3-27.8 % SL, O :26.5-28.5 % HL. The jaws are long, reaching behind the eyes. The gut is short, and the mid-section is swollen. pA :49.5-50.0 % SL. The eyes are drop-shaped. Pigmentation

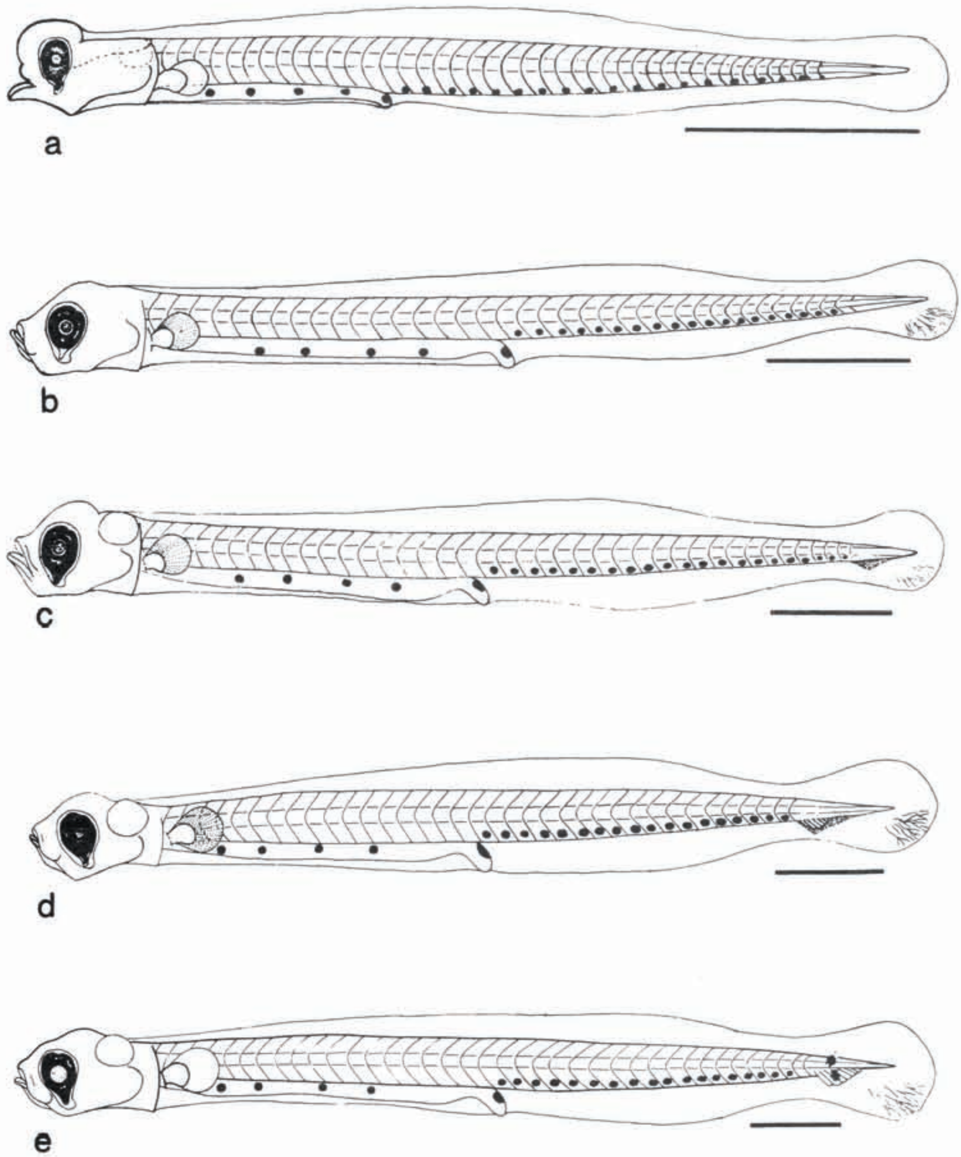

Fig. 4 a-e. – ***Krefftichthys anderssoni*** : a - 3.8 mm larva, b - 6.8 mm larva, c - 7.5 mm larva, d - 8.5 mm larva, e - 10,3 mm larva.

remains unchanged. Total myotomes, 39-40; trunk myotomes, 12-14. The fin rays are completely formed. D:13-15, A:20-22, P:12-13.

Krefftichthys anderssoni **(Lönnberg, 1905), (Fig. 4)**

K. anderssoni, 5.2-6.8 mm (Fig. 4a)

The body is slender, not deep. H:4.5-5.0 % SL. HL:11.5-12.5 % SL. The gut is shaped as a long tube of the same diameter along its entire length. pA: 50.0-50.5 % SL. The eyes are oval with a cone-like extension (drop-shaped), O :20.5-22.5 % HL. Pigmentation is seen as a subcaudal isomeric row of melanophores, four melanophores on either side of the gut and one large melanophore on the anal papilla. Total myotomes, 36-38; trunk myotomes, 17-18. The body is fringed by a low fin fold. The pectoral fins are short and fan-shaped.

K. anderssoni, 5.2-6.8 mm (Fig. 4b)

The body is not deep, slender. H:5.2-5:8 % SL. HL:12.8-14.5 % SL. pA:50.5-52.5 % SL, O : 22.5-24.5 % HL. The snout is short, equal to the transverse diameter of the eye. Pigmentation similar to 3.5-4.5 mm specimens with highly branched pigment cells located along rudiments of the caudal fin rays below the urostyle. Total myotomes, 36-38; trunk myotomes, 17-18.

K. anderssoni, 7.0-8.0 mm (Fig. 4c)

H:4.8-5.6 % SL. The head is small with a pointed snout. HL:12.6-14.5 % SL. O : 20.5-25.5 % HL. pA: 52.5-53.5 % SL. The pigmentation pattern remains unchanged. The urostyle is straight with a concentration of mesenchyme below it.

K. anderssoni, 8.2-10.2 mm (Fig. 4d)

H:5.5-6.5 % SL. HL:12.8-15.5 % SL. O :22.5-26.5 % HL. pA:52.5-55.0 % SL. The pigmentation pattern remains unchanged. The urostyle is straight with rudiments of 4-6 hypurals below.

K. anderssoni, 10.3-10.5 mm (Fig. 4e)

H:4.8-5.6 % SL. HL:13.5-16.5 % SL. The snout length is equal to the transverse eye diameter, O : 20.0-25.0 % HL. pA: 53.5-55.8 SL. The pigmentation has become more developed with two pigment cells appearing at the base of the caudal fin and below the urostyle in addition to the main pigment pattern.

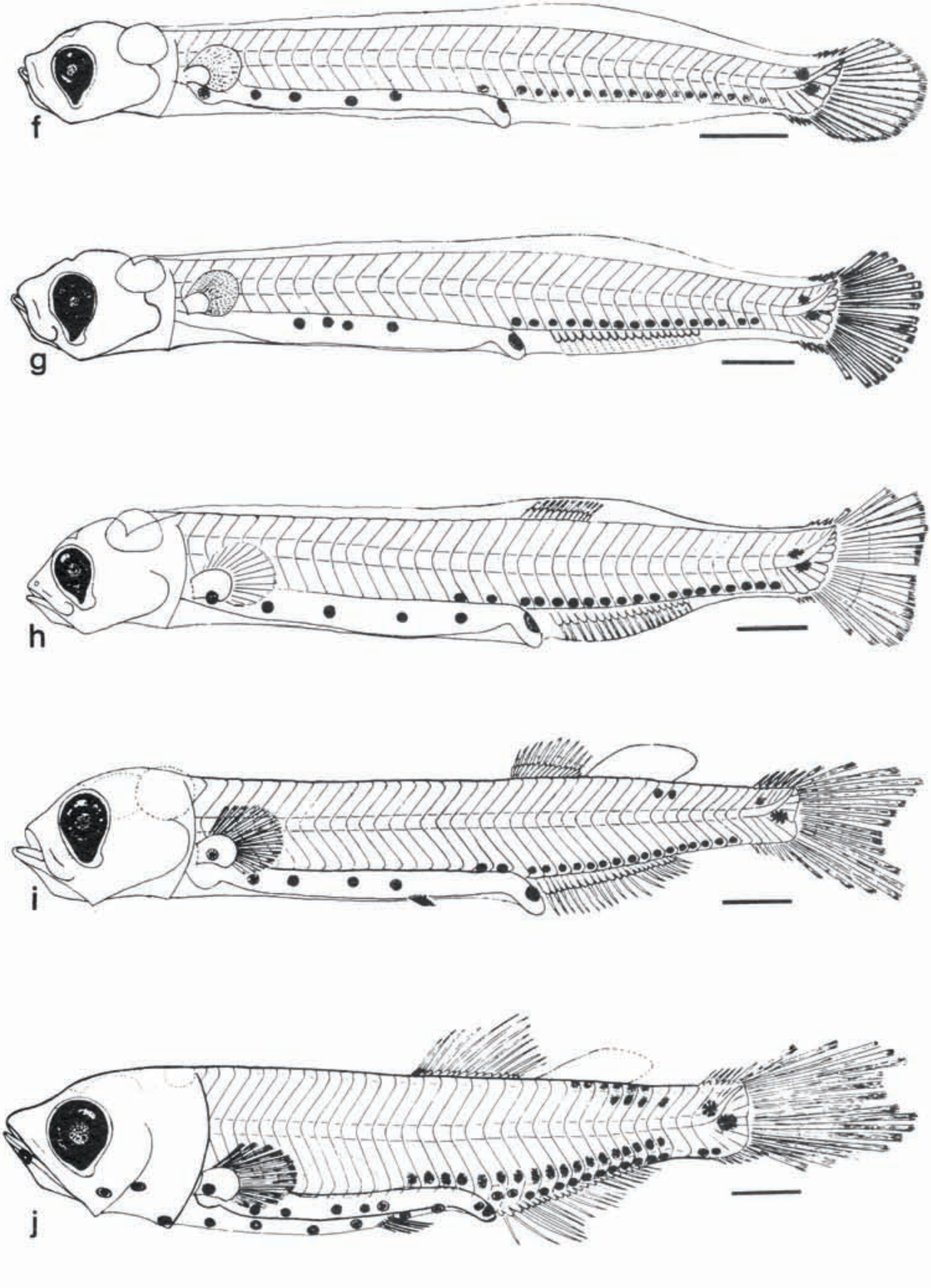

Fig. 4 f-j. – *Krefftichthys anderssoni* : f - 10.6 mm larva, g - 12.5 mm larva, h - 13.0 mm larva, i - 14.4 mm larva, j - 18.2 mm larva.

K. anderssoni, 10.6-10.8 mm (Fig. 4f)

H:5.6-7.6 % SL. HL:14.5-16.5 % SL. O :20.0-25.0 % HL. pA:54.4-56.2 % SL. Pigmentation remains unchanged. The urostyle is upturned. Hypurals and rudiments of rays are seen in the caudal fin.

K. anderssoni, 10.8-12.5 mm (Fig. 4g)

H:5.6-7.5 % SL. HL:15.4-16.5 % SL. O : 18.8-25.5 % HL. The snout length is equal to the transverse eye diameter. The pigmentation pattern remains unchanged. Rudiments of pterygophores in the anal fin are present.

K. anderssoni, 12.8-13.0 mm (Fig. 4h)

H:8.0-9.0 % SL. HL:15.3-16.3 % SL. O :21.7-22.2 % HL. pA:58.2-59.8 % SL. The pigmentation pattern and snout shape remain unchanged. The larvae have rudiments of rays in the anal and dorsal fins.

K. anderssoni, 14.4-16.8 mm (Fig. 4i)

H:14.2-14.8 % SL. HL:17.2-20.5 % SL. O:25.6-27.8 % HL. pA:61.5-63.8 % SL. The pigmentation pattern remains unchanged. The fin rays are completely formed. D :11-12, A:17-18, P:15-16. Total myotomes, 38-39; trunk myotomes, 18-19. Adipose fin is present.

K. anderssoni, 18.2-18.4 mm (Fig. 4j)

H:16.8-17.2 % SL. HL: 25.5-26.2 % SL. O : 17.5-17.8 % HL. pA:62.5-64.2 % SL. Total myotomes, 38-39; trunk myotomes, 18-20. D :11-12, A:17-18, P:15-16. The pigmentation has become more developed. A row of melanophores has appeared at the base of the adipose fin in addition to the main pigmentation pattern. The swimbladder is discernible. The photophores are partly formed.

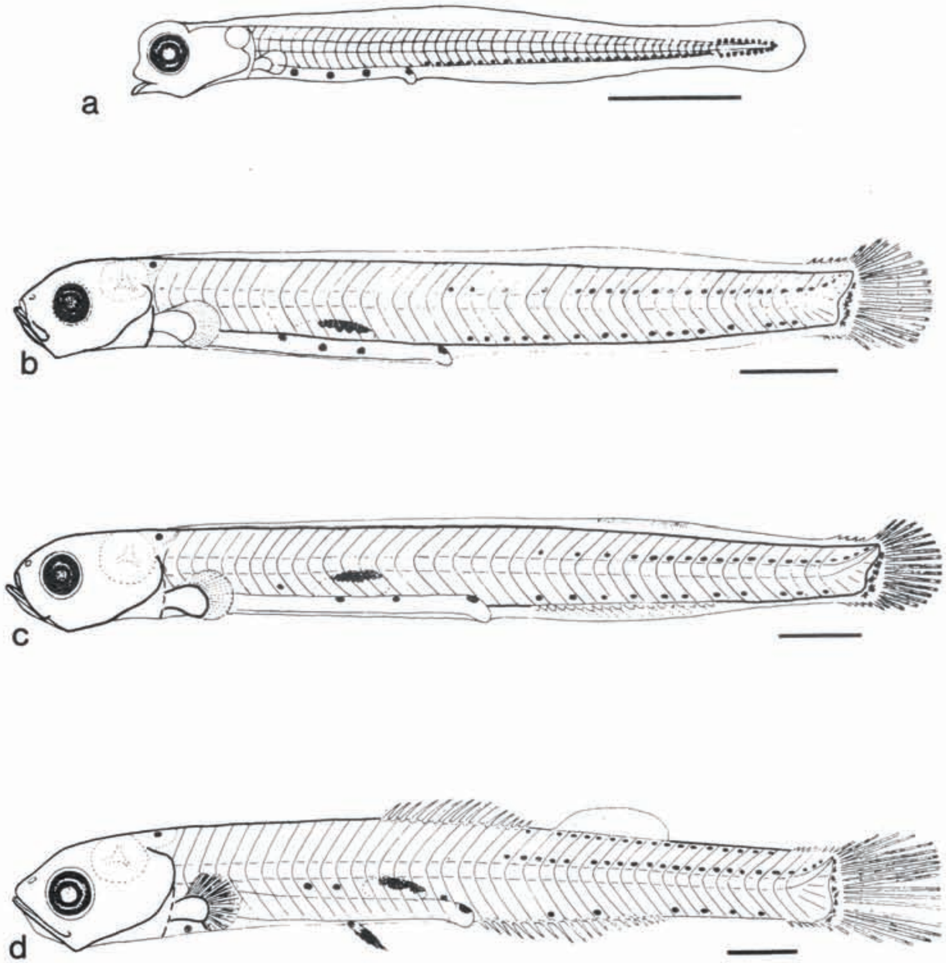

Fig. 5. – *Gymnoscopelus braueri* : a - 4.8 mm larva, b - 10.0 mm larva, c - 12.0 mm larva - d - 16.6 mm larva.

Gymnoscopelus braueri (Lönnberg, 1905), (Fig. 5)

G. braueri, 4.5-5.2 mm (Fig. 5a)

The body is slender, not deep. H :4.3-5.5 % SL. The head is short, not deep. HL:16.5-17.0 % SL. The eyes are round, O :26.0-28.5 % HL. The gut is long, shaped as a straight tube of the same diameter along its full length. pA:45.6-47.2 % SL. Pigmentation is a subcaudal isomeric row of melanophores, four melanophores on either side of the gut and one large melanophore on the anal papilla. There is a concentration of small pigment cells around the urostyle. Total myotomes, 40-42; trunk myotomes, 16-18. The body is fringed by a low embryonic fin fold. The urostyle is straight.

G. braueri, 10.0-11.5 mm (Fig. 5b)

H: 6.2-7.0 % SL. HL:16.8-17.3 % SL. O :25.5-27.5 % HL. The snout is equal to the eye diameter. pA: 52.54.0 % SL. The pigmentation pattern has changed. Additional pigmentation has appeared as an internal row of melanophores above the vertebrae, one melanophore in the occipital region and pigment cells at the base of the caudal fin rays. Overlying the gut, a swimbladder with a heavily pigmented inner wall is discernible. Total myotomes, 40-42; trunk myotomes, 16-18. The low fin fold has been retained. The urostyle is upturned.

G. braueri, 13.0-14.5 mm (Fig. 5c)

H:7.5-7.8 % SL. HL:17.0-17.5 % SL. O :25.8-26.5 % HL. pA:54.2-55.0 % SL. The pigmentation pattern and urostyle remain unchanged. There are rudiments of rays in the anal fin. Total myotomes, 40-42; trunk myotomes, 16-18.

G. braueri, 16.6-24.5 mm (Fig. 5d)

The body is slender, not deep. H:11.6-12.2 % SL. HL:18.6-19.0 % SL. O :25.5-27.2 HL. The snout is equal to the eye diameter. The jaws extend behind the eyes. The gut is long and tube-shaped. pA:54.5-56.5 % SL. A dorsal row of melanophores has appeared in addition to the main pigmentation pattern. There are pigment cells in the occipital region. Overlying the gut, the swimbladder with a highly pigmented upper inner wall is discernible. The fin rays are completely formed. D:15-16, A:17-19, P:13-14. Total myotomes, 40-43; trunk myotomes, 17-18.

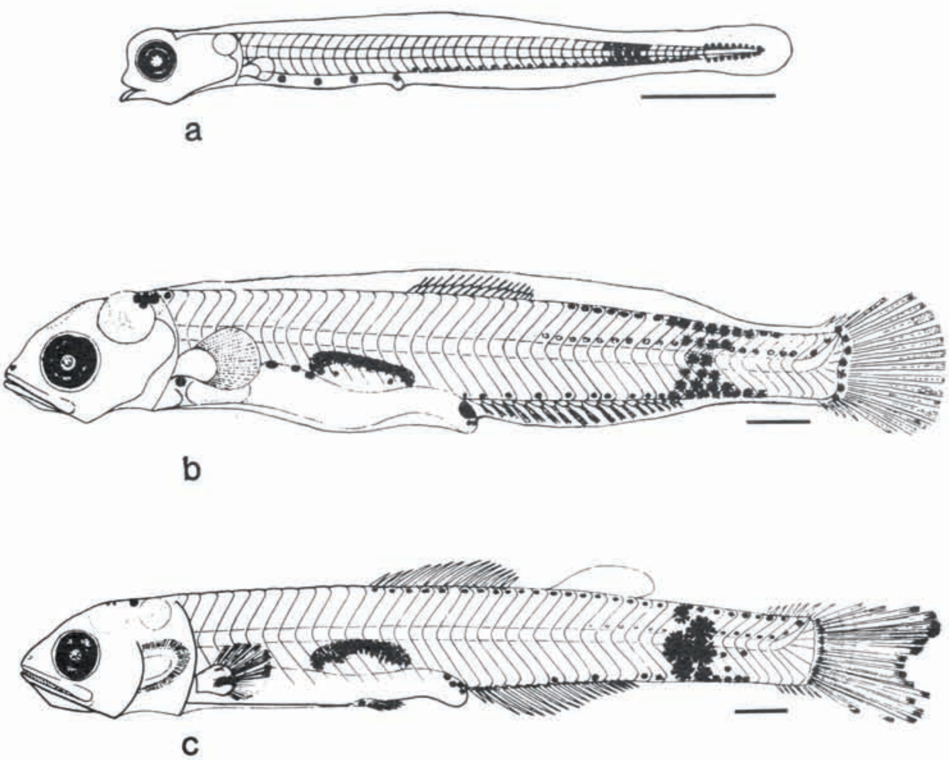

Fig. 6. – *Gymnoscopelus opisthopterus* : a - 5.0 mm larva, b - 14.3 mm larva, c - 20.0 mm larva.

Gymnoscopelus opisthopterus Fraser-Brunner, 1949, (Fig. 6)

G. opisthopterus, 4-5-8.5 mm (Fig. 6a)

The body is not deep, slender. H:4.5-6.5 % SL. HL:13.5-16.5 % SL, pO:24.5-25.0 % HL. The eyes are round, O:25.5-30.5 % HL. The gut is tube-shaped. pA: 48.5-50.0 % SL. Pigmentation is represented by a subcaudal isomeric row of melanophores, four melanophores on either side of the gut and one melanophore on the anal papilla. On the caudal peduncle there is a pigmented band consisting of 5-6 large stellate melanophores. There is a concentration of pigment cells around the urostyle. Total myotomes, 40-42; trunk myotomes, 14-16. The body is fringed by a low fin fold. The urostyle is straight.

G. opisthopterus, 14.8 mm (Fig. 6b)

H:12.7 % SL. SH:18.2 % SL. The eyes are large and round, O:34.3 % HL. pA: 54.5 % SL. The snout is pointed, its length equal to the eye diameter. Pigmentation has altered to include a dorsal row of melanophores in addition to the main pattern. There is an internal row of melanophores above the vertebrae, and pigment cells in the occipital region and at the base of the caudal fin rays. There are pterygophores and rudimentary rays in the anal and dorsal fins. Total myotomes, 43; trunk myotomes, 18. The fin fold has been retained. The urostyle is upturned.

G. opisthopterus, 20.5-28.5 mm (Fig. 6c)

The body is slender. H:12.5-18.0 % SL. HL:18.5-20.0 % SL. O:25.5-27.2% HL. pO: 21.8-23.5 % HL. pA: 56.0-57.8 % SL. The pigmentation pattern remains unchanged. Fin rays are completely formed. D: 14-15, A: 16-17, P: 15. Total myotomes, 42-43; trunk myotomes, 17-18.

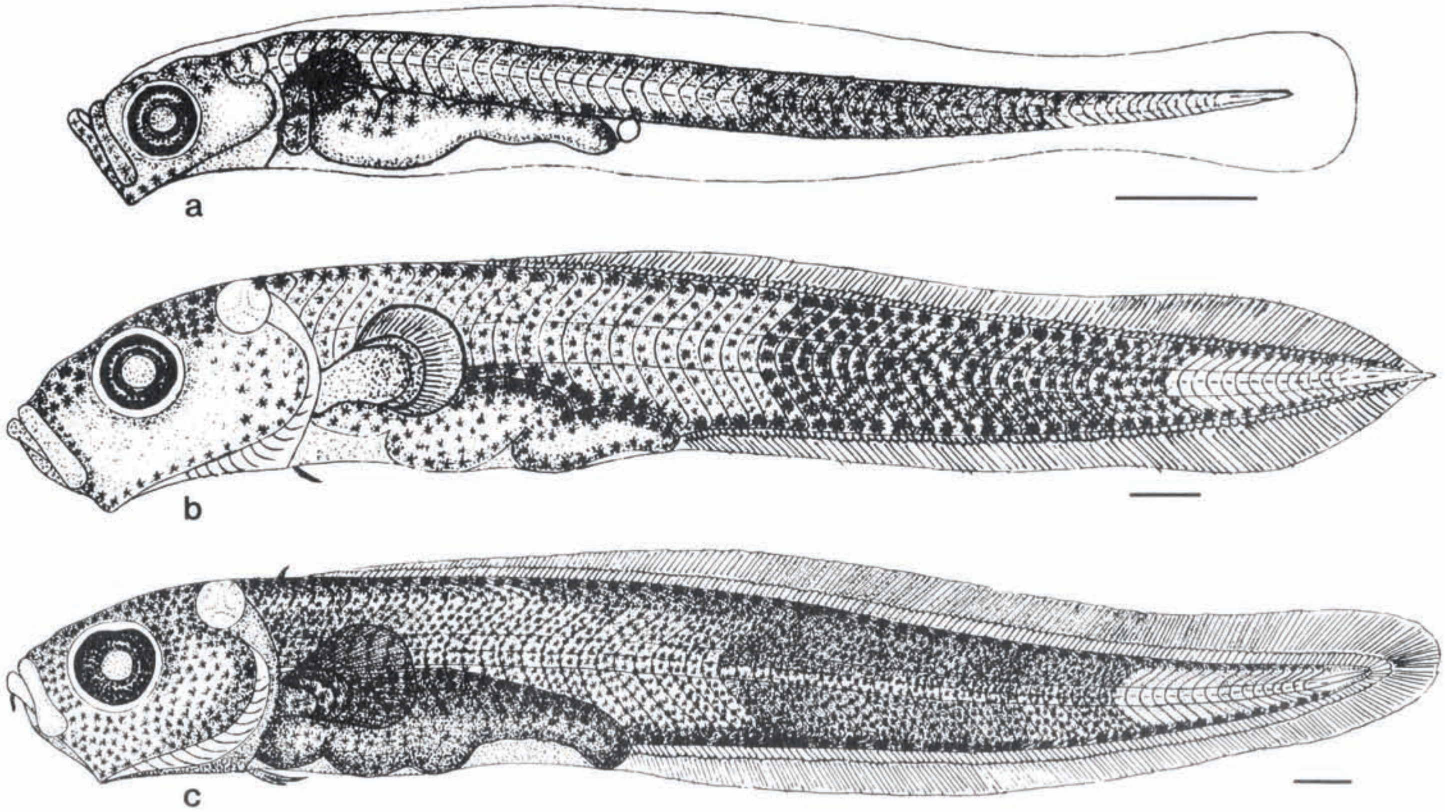

Fig. 7. – ***Muraenolepis microps*** : a - 9.5 mm larva, b - 20.5 mm larva, c - 26.5 mm larva.

MURAENOLEPIDAE

The family Muraenolepidae is represented by *Muraenolepis microps* Lönnberg (fig. 7), 6.5 to 28.5 mm in length, caught off South Georgia in the Scotia Sea in September-March.

Muraenolepis microps Lönnberg, 1905, (Fig. 7)

M. microps, 6.5-9.6 mm (Fig. 7a)

The body is slender, low. H: 5.5-7.5 % SL. The head is small with a pointed snout, the lower jaw projecting. HL:15.8-18.5 % SL, pO:16.2-18.5 % HL. The eyes are round, O : 30.8-33.5 % HL. The gut is short, with a swollen mid-section, the hindgut undifferentiated. The anus opens on the protopterygium side, therefore not reaching the edge of the embryonic fin fold. pA:40.0-44.5 % SL. The pectorals are short, fanlike. The body is fringed by a low, embryonic fin fold. The urostyle is straight. The larvae are heavily pigmented. There are rows of subcaudal and dorsal melanophores, a wide belt of small pigment cells around mid-tail, a parietal concentration of melanophores and pigment cells on the upper margin of the gut. Total myotomes, 63-64; trunk myotomes, 18-20.

M. microps, 16.5-22.0 mm (Fig. 7b)

H:10.5-11.5 % SL. The head is small with a pointed snout. HL:18.2-21.5 % SL, aO : 22.8-26.3 % HL. O :26.5-28.5 % HL. pA:43.5-46.5 % SL. The pectorals fins and urostyle unchanged. There are dorsal and anal fins continuous with the caudal. Pigmentation is represented by a subcaudal and a dorsal row of melanophores. On the midtail a wide pigment belt is plainly visible; the head is heavily pigmented. There are pigment cells on the gut and small pigment cells scattered over the body. Total myotomes, 64-65; trunk myotomes, 18-20.

M. microps, 26.5-28.5 mm (Fig. 7c)

H:10.5-12.5 % SL. HL:20.0-22.2 % SL, pO :27.5-28.5 % HL. O :29.5-31.5 % HL. pA:45.5-48.5 % SL. The urostyle is upturned. The fins are fully formed. The pigmentation pattern remains unchanged. Total myotomes, 64-65; trunk myotomes, 20-22.

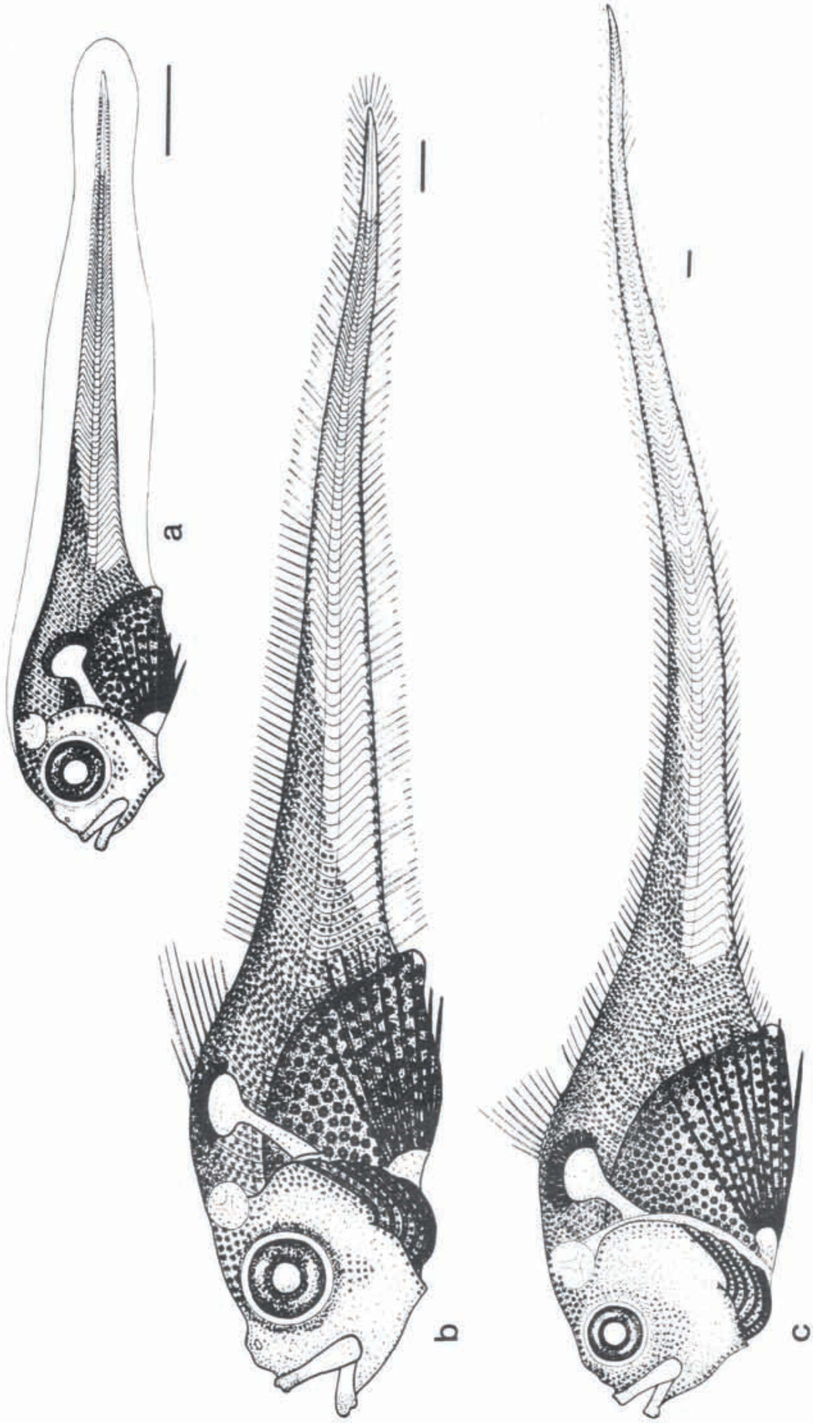

Fig. 8. – ***Macrourus whitsoni*** : a - 7.6 mm larva. b - 20.5 mm larva, c - 66.5 mm larva.

MACROURIDAE

The family Macrouridae is represented by one species, *Macrourus whitsoni* (Regan, 1913), 7.6-66.5 mm in length, caught off South Georgia in the Scotia Sea in December-April (Fig. 8).

Macrourus whitsoni (Regan, 1913), (Fig. 8)

M. whitsoni, 7.6 mm (Fig. 8a)

The body is short, gradually tapering to a long thin tail. H:8.5 % SL. The head is massive with a short snout. HL:12.8 % SL, pO :21.5 % HL. The eyes are round, O :41.0 % HL. The gut is short, with a swollen mid-section. pA:30.5 % SL. The pectoral has an elongated base. P:20, V:9. Total myotomes, more than 90; trunk myotomes, 14. The larva is heavily pigmented, particularly the trunk head and gut, pigmentation extending to the dorsal region of the tail.

M. whitsoni, 25.5 mm (Fig. 8b)

H:10.0 % SL. The head is massive with a short blunt snout. HL:20.5 % SL, pO :28.5 % HL. O :23.5 % HL. pA:35.5 % SL. Pectoral fin with an elongated base. The head, trunk, gut, dorsal region of the tail and ventral fin rays are heavily pigmented. The rays are completly formed. D :10, P:20, V:9.

M. whitsoni, 66.5 mm (Fig. 8c)

H: 8.5 % SL. HL:12.8 % SL, aO :21.5 % HL. O :41.5 % HL. The head, trunk and dorsal tail region are pigmented. The rays are formed. D :11, P:20, V:9.

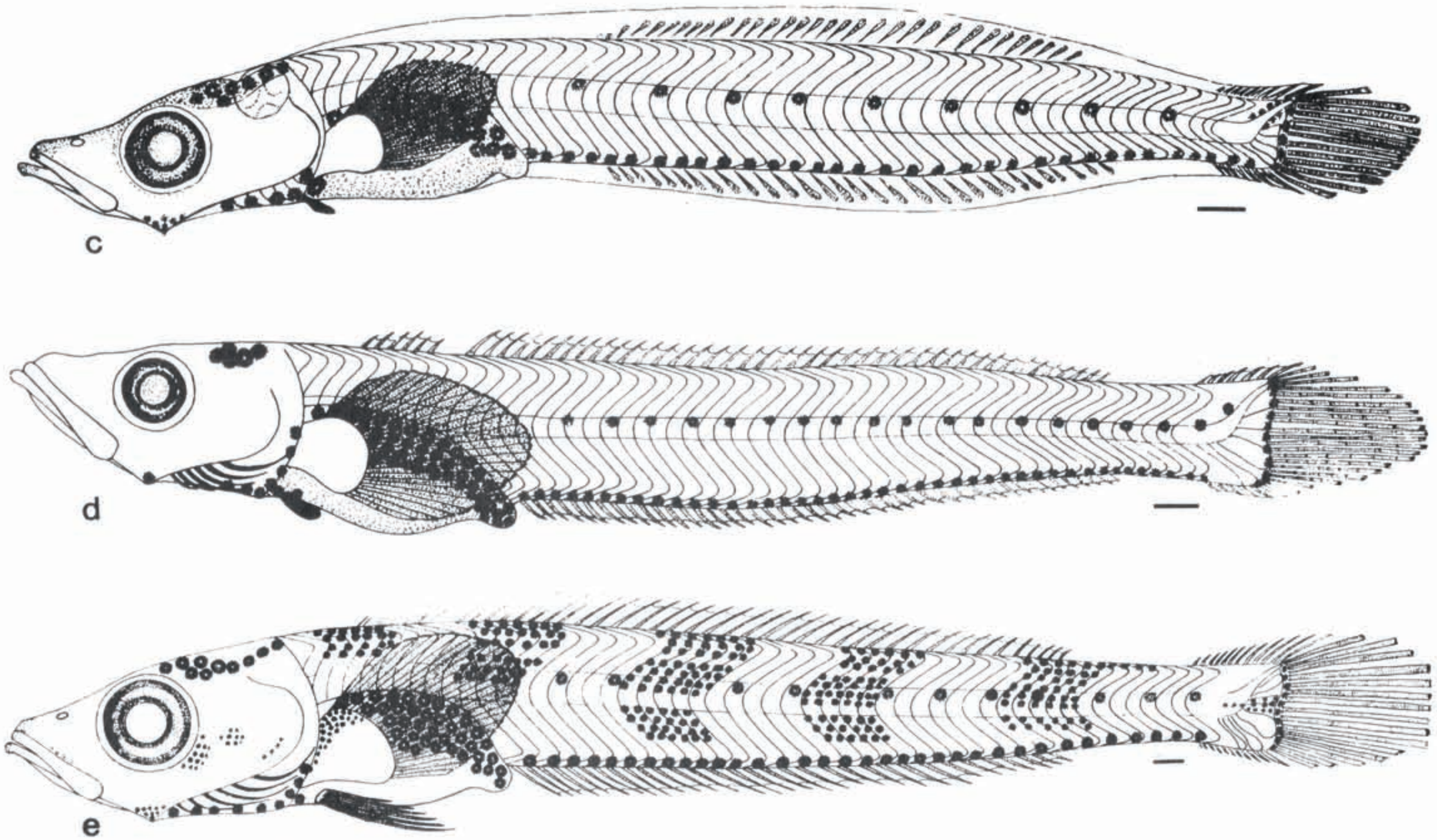

Fig. 9. – *Nototheniа larseni* : c - 29.5 mm larva, d - 35.0 mm larva, e - 48.5 mm larva.

NOTOTHENIIDAE

The family Nototheniidae is represented by 14 species: *Notothenia larseni* Lönnberg, *Notothenia gibberifrons* Lönnberg, *Notothenia angustifrons* Fisher, *Notothenia kempi* Norman, *Notothenia nudifrons* Lönnberg, *Notothenia güntheri* Norman, *Notothenia squamifrons atlantica* Permitin and Sasanov,*Trematomus newnesi* (Boulenger), *Trematomus eulepidotus* Regan, *Trematomus scotti* (Boulenger), *Dissostichus eleginoides* Smitt, *Pleuragramma antarcticum* Boulenger, *Notothenia coriiceps neglecta* Nybelin and *Aethotaxis mitopteryx* DeWitt.

Notothenia larseni Lönnberg, 1905, (Fig. 9)

Caught in the Scotia Sea off South Georgia in September-April.

N. larseni, 8.5-11.8 mm (Fig. 9a)

The body is slender, not deep. H:3.5-4.9 % SL. The head is rather small with a pointed snout. HL:14.2-17.8 SL, pO : 16.6-25.0 % HL. The gut is relatively short, with a swollen mid-section. pA:25.0-30.5 % SL. The eyes are round, O : 29.5-37 % HL. The pectoral is blade-like, set rather low. Pigmentation is represented by a subcaudal isomeric row of melanophores, and by peritoneal, parietal and urostyle concentrations of pigment cells. There is a lateral row of surface stellate melanophores arranged along the upper edge of the chorda. The body is fringed by a low embryonic fin fold. Total myotomes, 54-55; trunk myotomes, 8-10. The urostyle is straight with a small concentration of mesenchyme below.

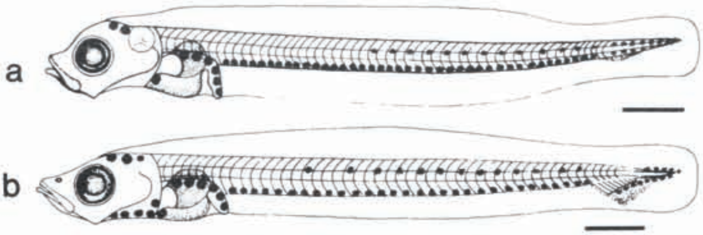

Fig. 9. – *Notothenia larseni* : a - 11.5 mm larva, b - 12.5 mm larva.

N. larseni, 12.5-18.5 mm (Fig. 9b)

H :4.9-5.6 % SL. The head is rather small with a pointed slightly elongated and flattened snout. HL:14.7-17.6 % SL, pO : 27.3-33.3 % HL. pA: 31.2-33.6 % SL. O :31.8-35.0 % HL. Pigmentation has changed slightly, with pigment cells appearing on the interbranchial isthmus in addition to the main pigment pattern. The body is fringed by a rather low fin fold. The urostyle is straight with rudimentary hypurals discernible below. Total myotomes, 54-55 ; trunk myotomes, 9-10.

N. larseni, 26.5-29.5 mm (Fig. 9c)

H: 7.5-9.7 % SL. HL: 21.2-22.3 % SL. pO :39.3-44.0 % HL. pA:35.5-37.6 %

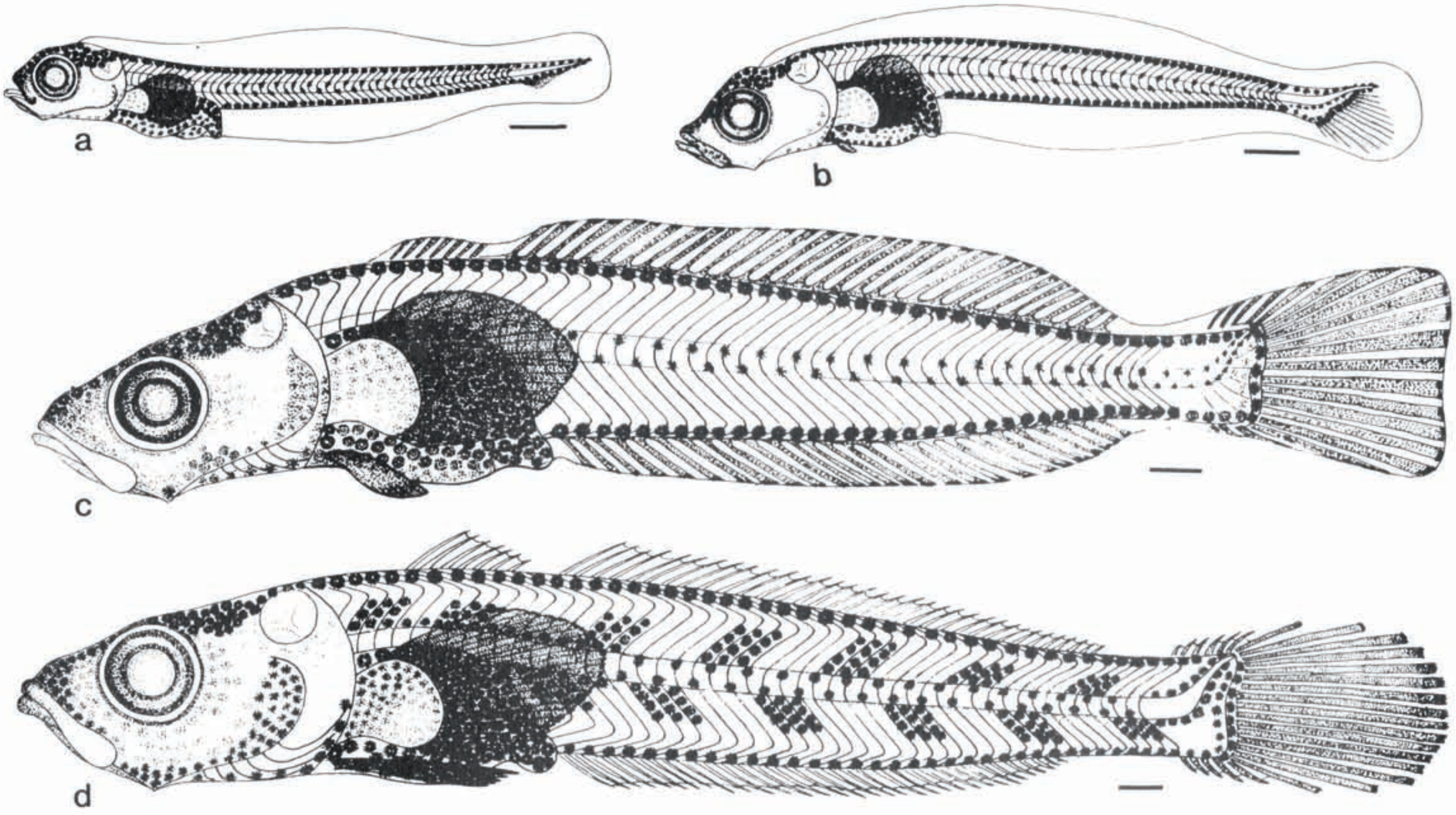

Fig. 10. – ***Notothenia gibberifrons*** : a - 11.0 mm larva, b - 13.0 mm larva, c - 28.0 mm larva, d - 35.0 mm larva.

SL. O :23.0-24.0 % HL. Pigmentation remains unchanged. The body is fringed by a rather low embryonic fin fold. There are rudimentary rays in the anal and dorsal fins. The urostyle is upturned. The caudal fin rays are completely formed. Total myotomes, 54-55; trunk myotomes, 10-12.

N. larseni, 35.0-42.0 mm (Fig. 9d)

H:12.7-15.0 % SL. HL:22.2-23.8 % SL, pO :25.6-32.5 % HL. pA:37.5-41.6 % SL. O :25.6-27.6 % HL. The pectoral is blade-like, set low on a long base. The depth of the caudal peduncle H: 7.1-8.3 % SL. Pigmentation remains unchanged. Total myotomes, 54-55; trunk myotomes, 10-12. D1 :5-6, D2:36-38, A:35-37, P:25.

N. larseni, 48.0-58.0 mm (Fig. 9e)

H:12.3-13.2 % SL. HL:24.3-25.5 % SL, pO :28.0-30.2 % HL. pA:39.3-42.7 % SL. The eyes are large and round, O :25.5-30.0 % HL. H:6.2-6.7 % SL. In addition to the pigmentation of the preceding larval groups, the post-larvae show five wide curved stripes on the body sides consisting of small pigment cells, thus acquiring a cross-bar pattern characteristic of the fry. Total myotomes, 54-55 ; trunk myotomes, 14-16. D1 :5-6, D2 :37-38, A:36-38, P:25, V:6.

***Notothenia gibberifrons* Lönnberg, 1905, (Fig. 10)**

Caught off South Georgia in the Scotia Sea in September-March.

N. gibberifrons, 8.5-11.5 mm (Fig. 10a)

The body is slender, not deep. H:4.7-6.2 % SL. The head is rather small with a short, rounded snout. HL:16.8-22.0 % SL, pO : 15.0-25.0 % HL. The gut is relatively short, with a swollen mid-section. pA:32.9-40.8 % SL. The eyes are round and large, O : 31.8-44.4 % HL. The pectoral is blade-like. Pigmentation is represented by subcaudal and dorsal isomeric rows and by the parietal, peritoneal and urostyle concentrations of melanophores. There is a double lateral row of surface stellate melanophores arranged along the vertebrae. There are also pigment cells on the interbranchial isthmus, on the upper snout, on the operculum edges, on the base of the pectoral fin and on the gut. The body is fringed by a relatively low, embryonic fin fold. Total myotomes, 50-51; trunk myotomes, 10-12. The urostyle is straight. Yolk sac is present.

N. gibberifrons, 11.6-13.5 mm (Fig. 10b)

H: 5.6-8.9 % SL. HL:16.7-19.6 % SL, pO :13.6-21.7 % HL. pA is relatively short, 34.6-38.4 % SL. O :31.8-37.8 % HL. Pigmentation and fin fold remain un-

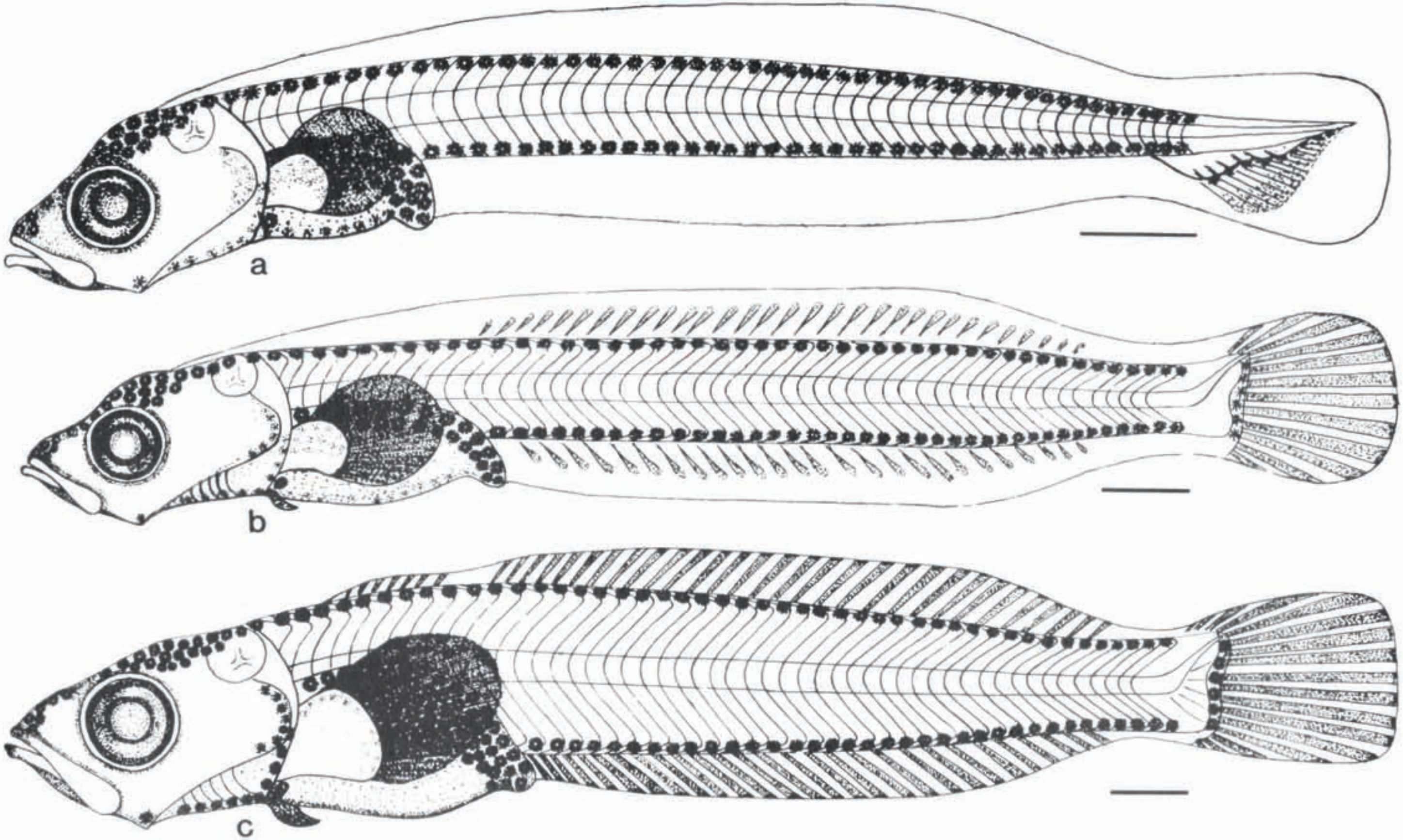

Fig. 11. – *Notothenia angustifrons* : a - 11.5 mm larva, b - 15.5 mm larva, c - 18.5 mm larva.

changed. Total myotomes, 50-51; trunk myotomes, 10-12. The urostyle is upturned with rudiments of hypurals and caudal fin rays below.

N. gibberifrons, 28.0-32.0 mm (Fig. 10c)

H:12.3-17.0 % SL. HL:22.3-28.0 % SL, pO :24.6-29.0 % HL. pA:42.0-48.0 % SL. Pigmentation remains unchanged. Total myotomes, 50-51; trunk myotomes, 14-15. The fin rays are fully formed, D1:5-6, D2:34-35, A:33-34, P:21.

N. gibberifrons, 35.0-38.5 mm (Fig. 10d)

H: 13.5-16.4 % SL. HL:25.6-26.4 % SL, pO :25.0-28.7 % HL. pA:40.0-45.5 SL. O :24.4-25.6 % HL. The jaws reach the vertical line through the mid-eye. The pectoral is blade-like. H: 6.4-6.9 % SL. In addition to pigmentation seen in the larvae from preceding groups, the post-larvae show cross-bar pigmentation on body sides consisting of concentrations of small pigment cells in the shape of blotches, D1:7-8, D2:32-34, A:32-34, P:21-22.

Notothenia angustifrons **Fischer, 1885, (Fig. 11)**

Caught off South Georgia in the Scotia Sea in November-December.

N. angustifrons, 11.5 mm (Fig. 11a)

The body is slender, not deep. H:7.3 % of SL. The head is small with a short, slightly pointed snout. HL: 19.0 % SL, pO :28.6 % HL. The gut is relatively short, with a swollen mid-section. pA is relatively short, 31.8 % SL. The eyes are round, O : 23.8 % HL. The pectoral is blade-like. Pigmentation is present as a subcaudal and a dorsal isomeric rows, parietal and peritoneal concentrations of melanophores. There are pigment cells on the interbranchial isthmus, on the upper part of the snout along operculum edges, on the base of the pectoral fin, at the bases of rudimentary caudal fin rays. The body is fringed by a low, embryonic fin fold. Total myotomes, 48; trunk myotomes, 12. The urostyle is straight with rudiments of hypurals and caudal fin rays below.

N. angustifrons, 14-15.5 mm (Fig. 11b)

H: 9.1-11.7 % SL. HL: 18.6-23.7 % SL, pO :26.9-31.3 % HL. pA is relatively short, 37.2-40.7 % SL. The eyes are large and round, O :25.0-30.7 % HL. h: 4.5-7.1 % SL. Pigmentation and fin fold remain unchanged. Total myotomes, 48-50;

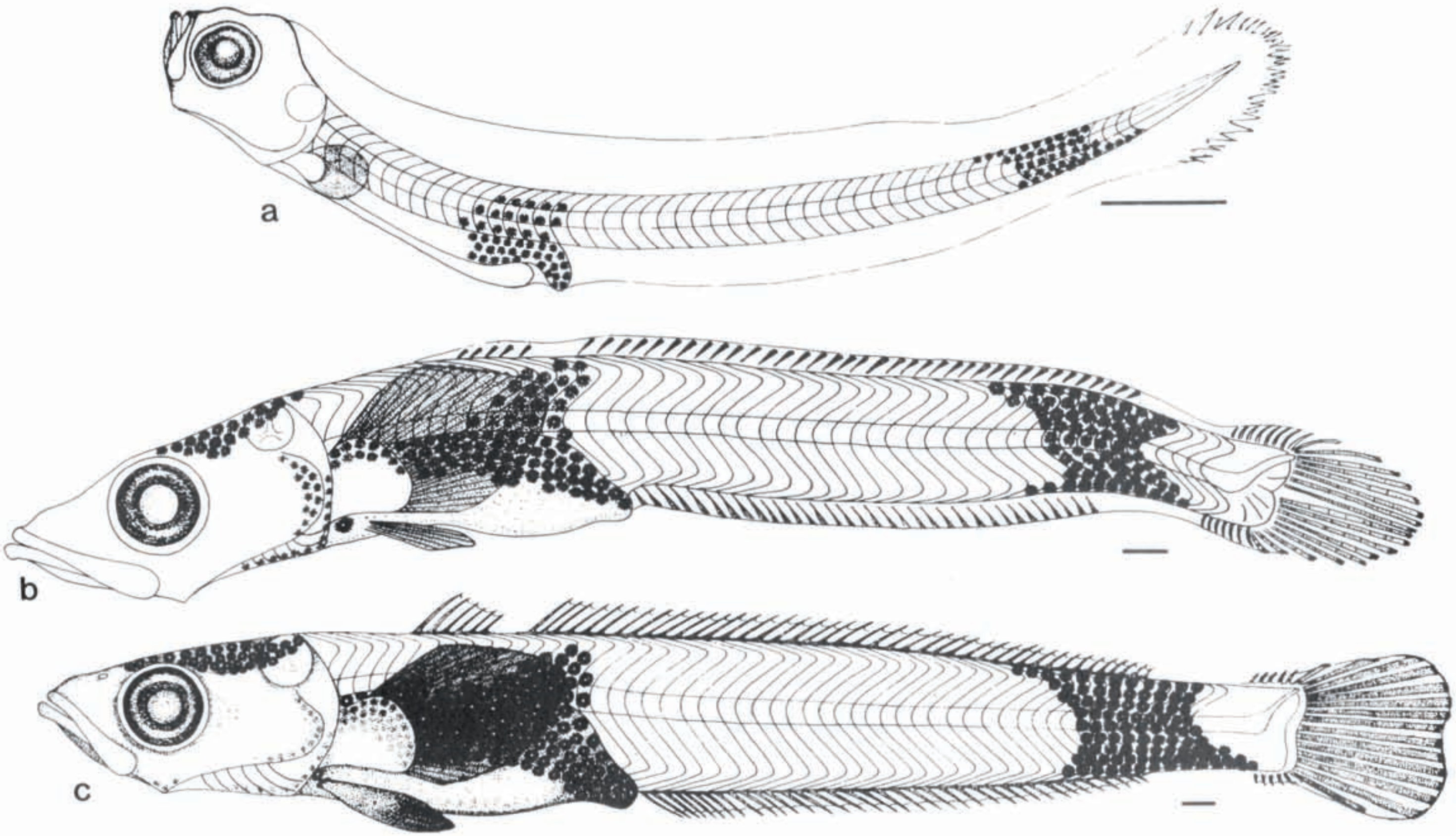

Fig. 12. – *Notothenia kempi* : a - 9.5 mm larva, b - 32.5 mm larva, c - 45.5 mm larva.

trunk myotomes, 12-14. The urostyle is upturned. There are rudiments of rays in the dorsal and anal fins.

N. angustifrons, 17.2-20.0 mm (Fig. 11c)

H:10.0-14.7 % SL. HL:20.0-23.5 % SL, pO :25.0-28.6 % HL. pA:39.4-41.7 % SL. O : 25.0-31.3 % HL. The pectoral is blade-like.h :6.2-8.8% SL. Pigmentation and fin fold remain unchanged. Total myotomes, 48-50; trunk myotomes, 14-15. Rays are formed in all the fins. D1:5-8, D2:28-30, A:29-31, P:19-21.

***Notothenia kempi* Norman, 1937, (Fig. 12)**

Caught in the Scotia Sea off the South Orkney Islands and South Shetlands Islands in January-March.

N. kempi, 9.5-10.5 mm (Fig. 12a)

The body is not deep, slender. H: 5.2-5.5 % SL. The head is small with a short snout. HL:12.9-15.3 % SL, pO :13.3-16.6 % HL. The gut is relatively long. pA:39.5-41.6 % SL. The eyes are large and round, O :33.3-42.8 % HL. Pigmentation is represented by a peritoneal concentration of melanophores and two bands of pigment cells, one around the body at the hindgut level, the other around the caudal peduncle. The body is fringed by a low, embryonic fin fold. Total myotomes, 50-52; trunk myotomes, 16-18. The urostyle is straight.

N. kempi, 32.5-38.5 mm (Fig. 12b)

H:9.7-10.8 % SL. HL:21.8-22.8 % SL, pO :28.2-30.5 % HL. The gut is relatively long, with a swollen mid-section. pA:44.5-46.8 % SL. O:21.5-24.4 % HL. The pectoral is blade-like. h :5.5-6.8 % SL. Pigmentation has developed when compared to that of the larvae from preceding size-groups, with additional pigmentation as a parietal concentration of pigment cells as well as concentrations of pigment cells on operculum edges and on the base of the pectoral fin. Total myotomes, 50-52; trunk myotomes, 18-20. The fin rays are completely formed. D1:5-6, D2:36-38, A:32-33, P:25-26.

N. kempi, 41.5-47.3 mm (Fig. 12c)

H:10.3-13.4 % SL. HL:23.0-26.8 % SL, pO :27.2-28.0 % HL. pA:46.3-48.5 % SL. O : 21.7-25.6 % HL. The pectoral is blade-like. h :6.1-7.0 % SL. Pigmentation remains unchanged. Total myotomes, 50-52; trunk myotomes, 18-20. The fin rays are completely formed. D1:5-6, D2:36-38, A:32-33, P:25-26.

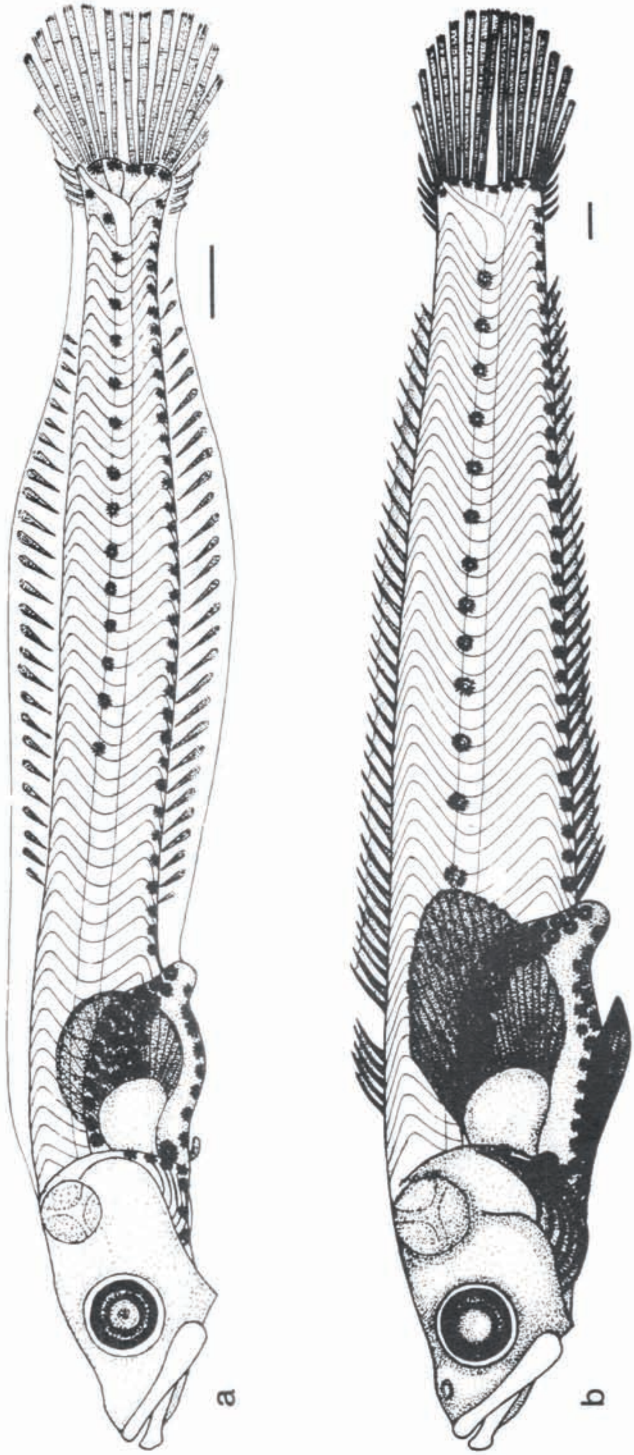

Fig. 13. – *Notothenia nudifrons* : a - 19.0 mm larva, b - 40.0 mm larva.

Notothenia nudifrons Lönnberg, 1905, (Fig. 13)

Caught in the Scotia Sea off South Georgia in September-April.

N. nudifrons, 15.6-19.5 mm (Fig. 13a)

The body is not deep, slender. H:7.3-7.6 % SL. The head is small with an elongated pointed snout, HL:20.6-23.5 % SL, pO :31.3-34.3 % HL. The gut is short, with a swollen mid-section. pA:31.5-38.2 % SL. The eyes are round, O :28.5-28.8 % HL. Pigmentation is present as a subcaudal isomeric row of melanophores, a lateral row and a peritoneal concentration of pigment cells. There are also pigment cells on the lower region of the gut, on the interbranchial isthmus and at the base of caudal fin rays. The body is fringed by a low fin fold. There are rudiments of rays in the dorsal and anal fins. The caudal fin rays are completely formed. The urostyle is upturned. Total myotomes, 50-52; trunk myotomes, 12-14.

N. nudifrons, 40.0-43.0 mm (Fig. 13b)

H: 16.5-18.2 % SL. HL:21.2-24.2 % SL, pO :20.2-23.5 % HL. pA:40.8-44.2 % SL. The eyes are large and round, O :23.5-25.6 % HL. The pectoral fin is blade-like, set rather low. h :8.5-9.1 % SL. Pigmentation remains unchanged. The fin rays are completely formed. D1: 5, D2:37-38, A:34-35, P:22-23. Total myotomes, 51-52; trunk myotomes, 14-15.

Notothenia squamifrons atlantica Permitin & Sazonov, 1974, (Fig. 14)

Caught in the Scotia Sea off South Georgia in December.

N. squamifrons atlantica, 29.5-30.8 mm larvae (Fig. 14)

The body is not deep, slender. H: 12.8-13.5 SL. The head is small with a short pointed snout. HL: 24.5-25.5 % SL, pO :27.5-28.5 % HL. The gut is relatively long, with a swollen mid-section. pA:43.5-45.2 % SL. The eyes are large and round, O : 27.8-30.5 % HL. The pectoral fin is blade-like. h :6.8-7.5 % SL. Pigmentation appears as a subcaudal isomeric row of melanophores, parietal and peritoneal concentrations

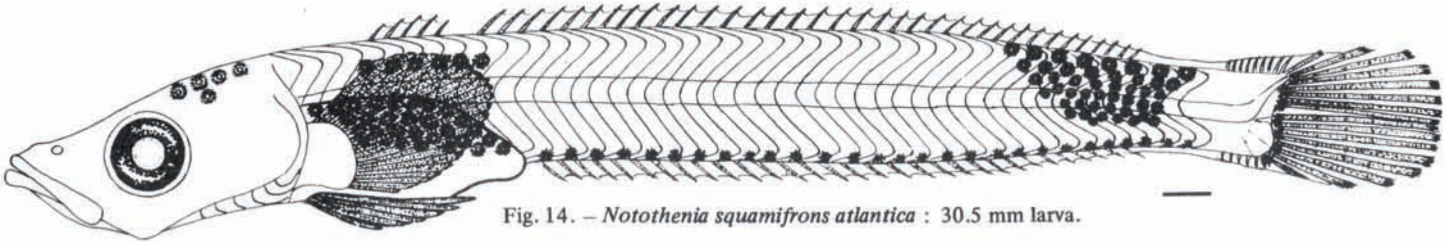

Fig. 14. – *Notothenia squamifrons atlantica* : 30.5 mm larva.

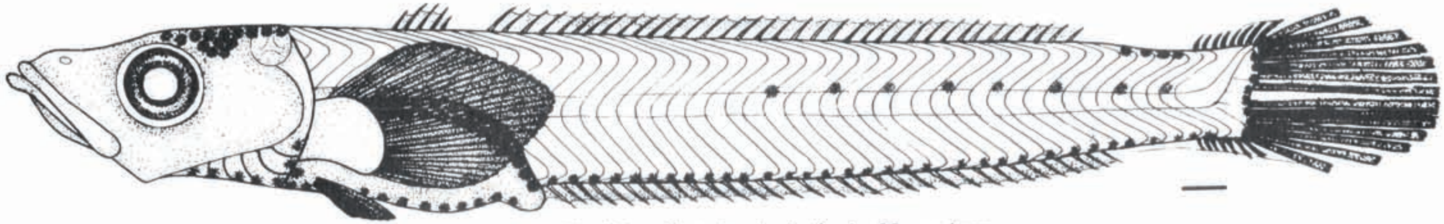

Fig. 15. – *Notothenia güntheri* : 33 mm larva.

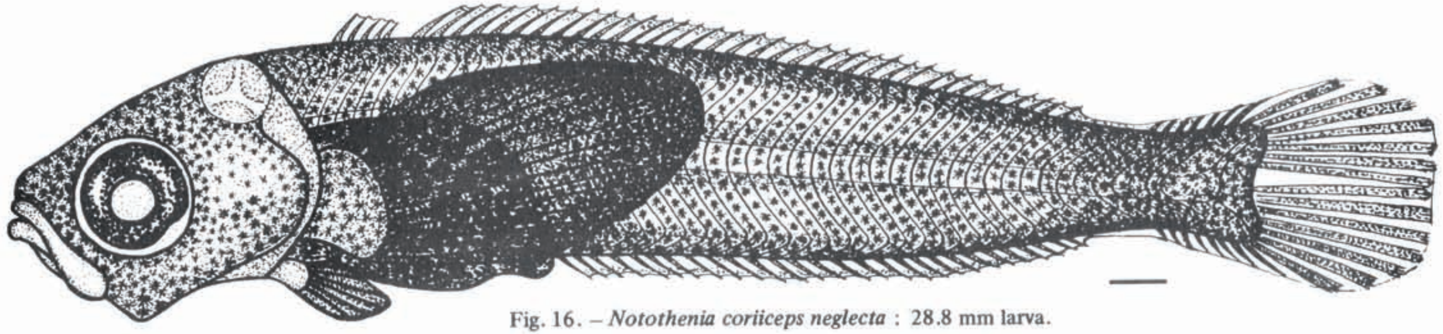

Fig. 16. – *Notothenia coriiceps neglecta* : 28.8 mm larva.

of pigment cells, concentrations of pigment cells in the upper region of the caudal peduncle and at the base of caudal fin rays. The fin rays are completely formed. D1:4-5, D2:36-37, A:32, P:24-25. Total myotomes, 49-52.

Notothenia güntheri Norman, 1937, (Fig. 15)

Caught in the Scotia Sea off South Georgia in December.

N. güntheri, 32.5-35.0 mm (Fig. 15)

The body is not deep, slender. H: 8.9-12.5 % SL. The head is small with an elongated pointed snout. HL: 24.0-25.0 % SL, pO: 28.5-30.5 % HL. The gut is short, with a swollen mid-section. pA: 40.0-41.0 % SL. The eyes are large and round, O: 20.0-21.3 % HL. h: 7.6-8.5 % SL. The larvae are pigmented. There is a subcaudal isomeric row of melanophores, melanophores in the upper and lower regions of the gut, a lateral row of pigment cells, 3-4 pigment cells on the dorsal region of the caudal peduncle, a vertical row of pigment cells at the base of the caudal fin rays, a concentration of pigment cells in the parietal region and pigment cells on the interbranchial isthmus. The fin rays are completely formed. D1:4-5, D2:34-37, A:32-35, P:26-27.

Notothenia coriiceps neglecta Nybelin, 1951, (Fig. 16)

Caught in the Scotia Sea off South Georgia in February.

N. coriiceps neglecta, 28.8 mm (Fig. 16)

The body is relatively deep. H:26.5 % S.L. The head has a short pointed snout, HL: 24.5 % SL, pO: 24.0 % HL. The gut is short, with a swollen mid-section. pA: 41.5 % SL, h: 8.5 % SL. The eyes are round, O: 33.0 % HL. The larva is heavily pigmented all over the body. The fin rays are completely formed. D1: 5, D2: 35, A:28, P:18. Total myotomes, 53; trunk myotomes, 16.

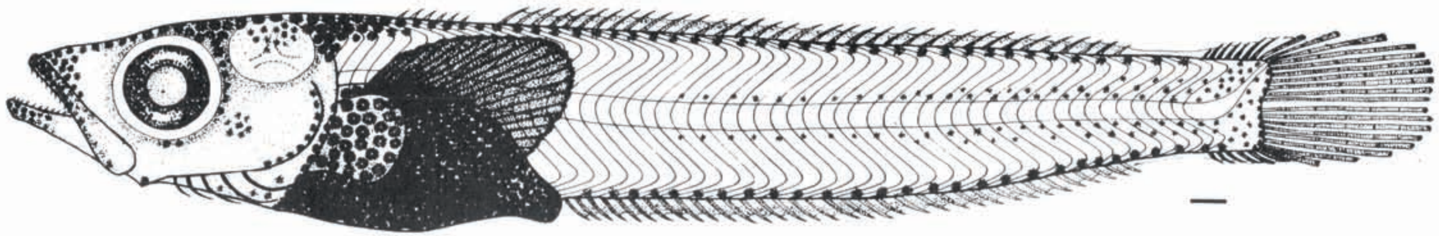

Fig. 17. – *Trematomus eulepidotus* : 40.5 mm larva.

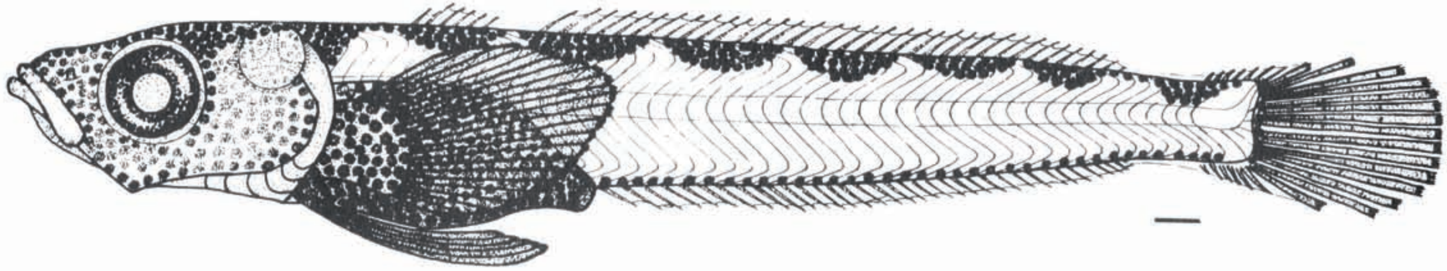

Fig. 18. – *Trematomus scotti* : 35.5 mm larva.

Trematomus eulepidotus Regan, 1914, (Fig. 17)

Caught in the Scotia Sea off the South Orkney Islands and South Shetland Islands in January-February.

T. eulepidotus, 31.3-43.5 mm (Fig. 17)

The body is not deep, slender. H: 13.5-14.4 % SL. The head is small with a pointed snout, HL: 24.4-26.8 % SL, pO : 25.5-29.4 % HL. The gut is short, with a swollen mid-section, pear-shaped. pA: 44.2-46.0 % SL. The pectoral fin is blade-like. h : 6.5-8.4 % SL. Pigmentation appears as subcaudal and dorsal isomeric rows of melanophores, parietal and peritoneal concentrations of melanophores. The entire gut is covered by pigment cells. There are pigment cells on the fore part of the head, on the snout and jaws, in the occipital region, on the base of the pectoral fin and on the edges of the operculum. There are also concentrations of small pigment cells on the side of the tail and at the base of the caudal fin. Total myotomes, 54-56; trunk myotomes, 14-16. The fin rays are completely formed. D1:6-7, D2:35-36, A:33-34, P:27-28.

Trematomus scotti Boulenger, 1907, (Fig. 18)

Caught in the Scotia Sea off the South Orkney Islands and South Shetland Islands in January-February.

T. scotti, 35.5-37.8 mm (Fig. 18)

The body is not deep, slender. H:13.5-15.6 % SL. The head is small with an elongated pointed snout. HL: 25.5-26.5 % SL, pO: 24.0-0,25.6 % HL. The gut is short, with a swollen mid-section, pear-shaped. pA: 46.5-47.5 % SL. The eyes are large and round, O : 29.4-30.5 % HL. The pectoral fin is blade-like. h : 5.9-6.5 % SL. Pigmentation appears as subcaudal and dorsal rows of melanophores, the dorsal row broken up into separate concentrations of pigment cells. There are parietal and peritoneal concentrations of pigment cells. The gut is completely covered by pigment cells and appears black. There are pigment cells on the anterior of the head, on the snout, in the occipital region, on operculum edges and at the base of caudal fin rays. Total myotomes, 46-48, trunk myotomes, 12-14. The fin rays are completely formed. D1:5.6, D2:32-34, A:30-32, P:20-22.

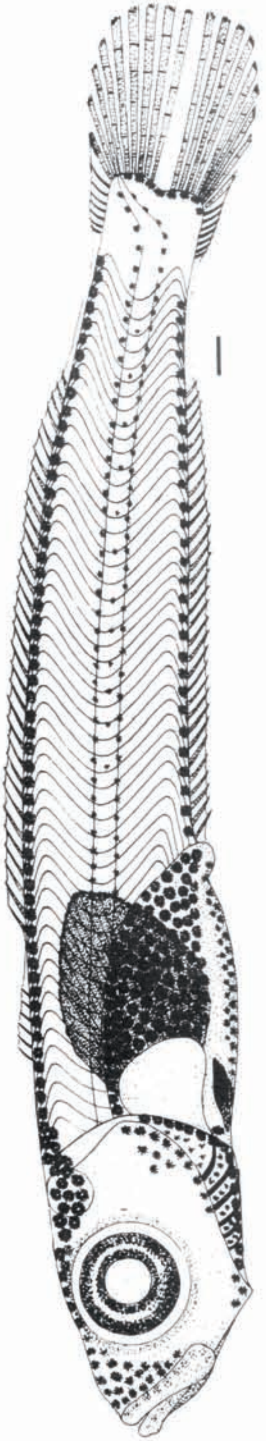

Fig. 19. – *Trematomus newnesi* : 38.5 mm larva.

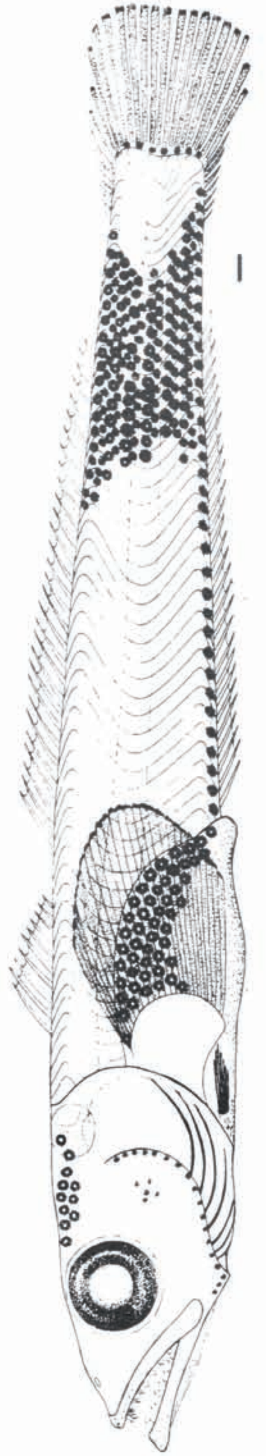

Fig. 20. – *Dissostichus eleginoides* : 55.5 mm larva.

Trematomus newnesi Boulenger, 1902, (Fig. 19)

Caught in the Scotia Sea off the South Orkney Islands in January.

T. newnesi, 38.5 mm (Fig. 19)

The body is not deep, slender. H:13.8 % SL. The head is small with a pointed snout. HL:23.8 % SL, pO :29.2 % HL. The gut is short, with a swollen mid-section, pear-shaped. pA:42.5 % SL. The eyes are large and round, O:26.5 % HL. The pectoral fin is blade-like, set rather low. h :7.5 % SL. Pigmentation appears as subcaudal and dorsal isomeric rows of melanophores, parietal and peritoneal concentrations of pigment cells, melanophores on the anterior of the head, on the snout, on jaw edges, in the occipital region, at the base of the caudal fin rays and on operculum edges. There is a double lateral row of melanophores on the side of the caudal region arranged as two parallel rows above and below the vertebrae. Total myotomes, 54 ; trunk myotomes, 16. The fin rays are completely formed. D1 : 6, D2 : 33, A:30, P:25.

Dissostichus eleginoides Smitt, 1898, (Fig. 20)

Caught in the Scotia Sea off South Georgia in December-January.

D. eleginoides, 49.3-62.0 mm (Fig. 20)

The body is slender, not deep. H:12.3-14.0 % SL. The head is relatively large with an elongated snout, HL: 25.3-28.5 % SL, pO :25.6-33.1 % HL. The gut is short, with a swollen mid-section. pA: 44.8-47.7 % SL. The eyes are large and round, O : 21.3-27.4 % HL. The jaws are robust with long conical (canine-shaped) teeth. There are similar teeth on the vomer. The jaws are relatively long, reaching the vertical line through the mid-eye. The pectoral is blade-like. h :7.5-8.6 % SL. Pigmentation is represented as peritoneal and parietal concentrations of melanophores, a subcaudal isomeric row of melanophores, a concentration of small pigment cells arranged as a band around the caudal peduncle and concentrations of small pigment cells at the base of the caudal fin rays and along operculum edges. Total myotomes, 54-55; trunk myotomes, 18-20. The fin rays are completely formed. D1:9-10, D2: 26-29, A:26-30, P:25-26.

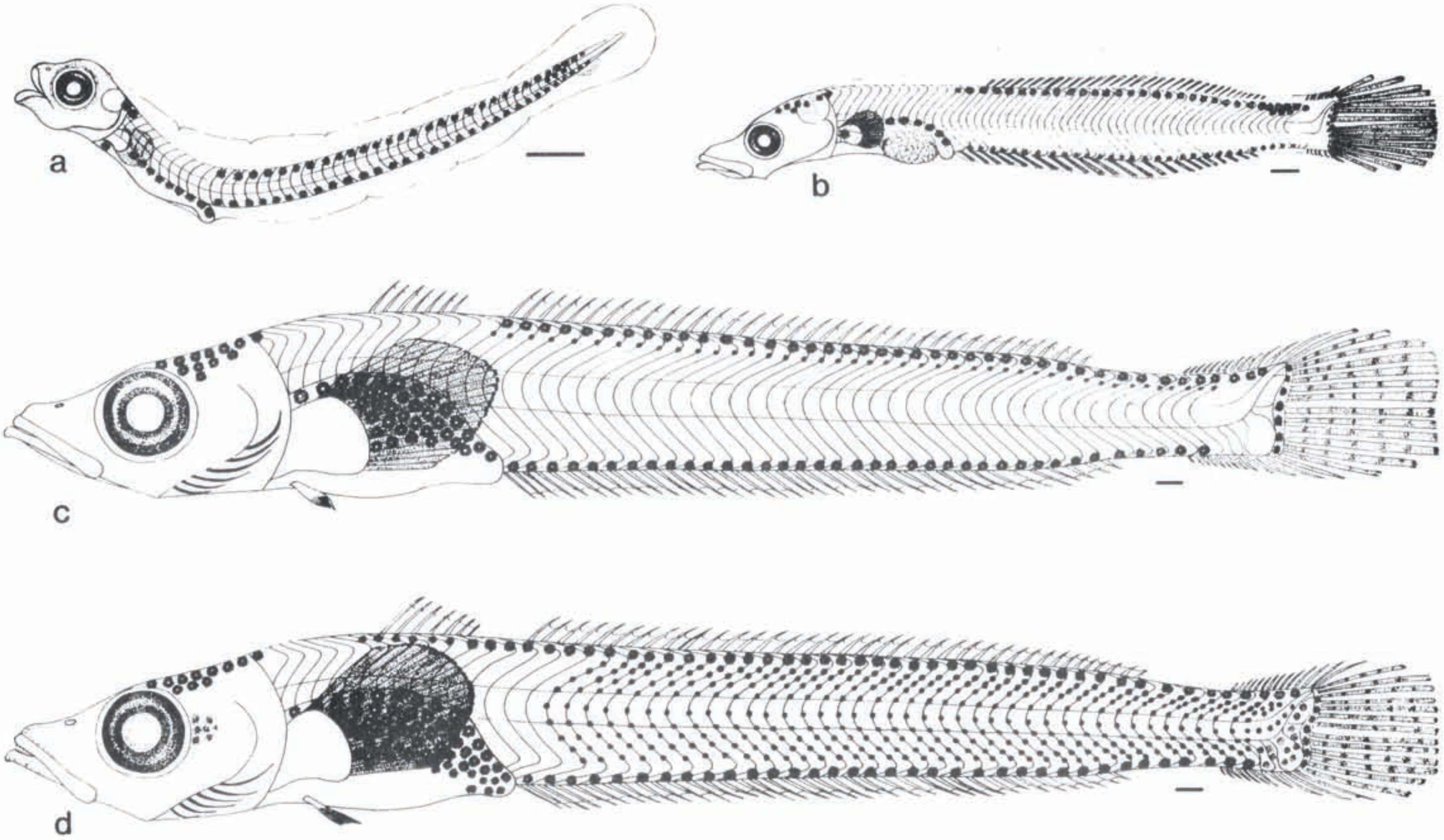

Fig. 21. – *Pleuragramma antarcticum* : a - 12.5 mm larva, b - 26.5 mm larva, c - 56.5 mm larva, d - 58.5 mm larva.

Pleuragramma antarcticum Boulenger, 1902, (Fig. 21)

Caught in the Scotia Sea off the South Orkney Islands and South Shetland Islands in December-March.

P. antarcticum, 12.5 mm (Fig. 21a)

The body is slender, not deep. H:4.2 % SL. The head is small with a pointed snout, HL: 12.5 % SL, pO : 20.2 % HL. The gut is elongated, with a swollen mid-section. pA:33.2 % SL. The eyes are large and round, O :33.4 % HL. The pectoral fin is short, blade-like. The body is fringed by a low embryonic fin fold. Pigmentation is represented by subcaudal and dorsal isomeric rows of melanophores, pigment cells on the occipital region and the gut. Total myotomes, 54; trunk myotomes, 10.

P. antarcticum, 26.0-26.5 mm (Fig. 21b)

H: 8.0-8.5 % SL. The head is small with an elongated snout. HL:17.5-18.5 % SL, pO : 25.0-25.5 % HL. pA:34.5-36.5 % SL. O :23.8-24.6 % HL. The pectoral fin is blade-like. h :4.3-4.6 % SL. Pigmentation is represented by a subcaudal isomeric row of melanophores and an isomeric row of melanophores on the upper part of the tail. There are also melanophores at the base of caudal fin rays, on the head and the gut. There are rudimentary rays in the anal and dorsal fins. Total myotomes, 54-55; trunk myotomes, 18-20.

P. antarcticum, 53.7-60.0 mm (Fig. 21c)

H:10.0-12.7 % SL. The head is small with a pointed slightly flattened snout, HL:18.3-21.5 % SL, pO : 35.0-38.1 % HL. The gut is short, with a swollen mid-section, pear-like. pA:38.2-41.1 % SL. The eyes are large and round, O:26.0-30.0 % HL. The pectoral fin is blade-like. h :5.14-6.1 % SL. Pigmentation pattern nearly unchanged except the presence of parietal and peritoneal concentrations of melanophores. There are pigment cells at the base of caudal fin rays and on the caudal fin rays. Total myotomes, 53-55; trunk myotomes, 18-20. The fin rays are completely formed. D1:68, D2:33-38, A:36-39, P:20-21.

P. antarcticum, 61.5-64.5 mm (Fig. 21d)

H:11.7-12.0 % SL. HL: 18.52-18.92 % SL, pO : 35.0-38.1 % HL. pA: 37.70-38.89 % SL. The eyes are large and round, O :23.81-28.0 % HL. The pectoral fin is blade-like. h : 5.49-6.48 % SL. Pigmentation is represented by subcaudal and dorsal isomeric rows and by parietal and peritoneal concentrations of melanophores. There are pigment cells at the base of the caudal fin rays, on opercula and along the myotomes on myosepta, which makes the body appear cross-banded. Total myotomes, 53-55; trunk myotomes, 18-20. The fin rays are fully formed. D1:6-8, D2:33-38, A:36-39, P:20.21.

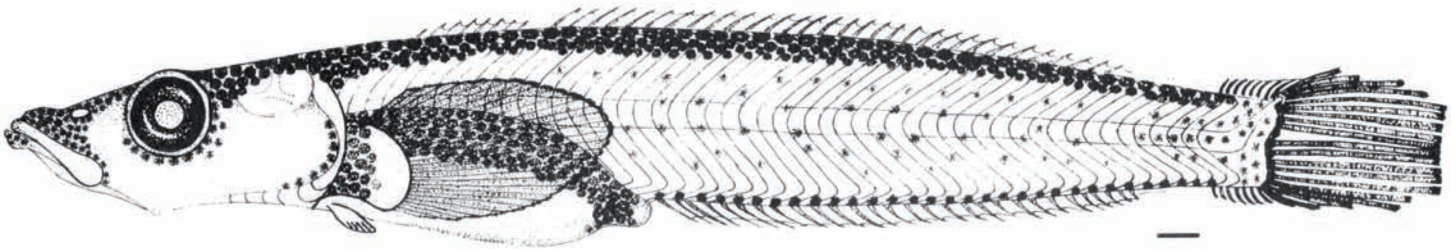

Fig. 22. – *Aethotaxis mitopterix* : 38.5 mm larva.

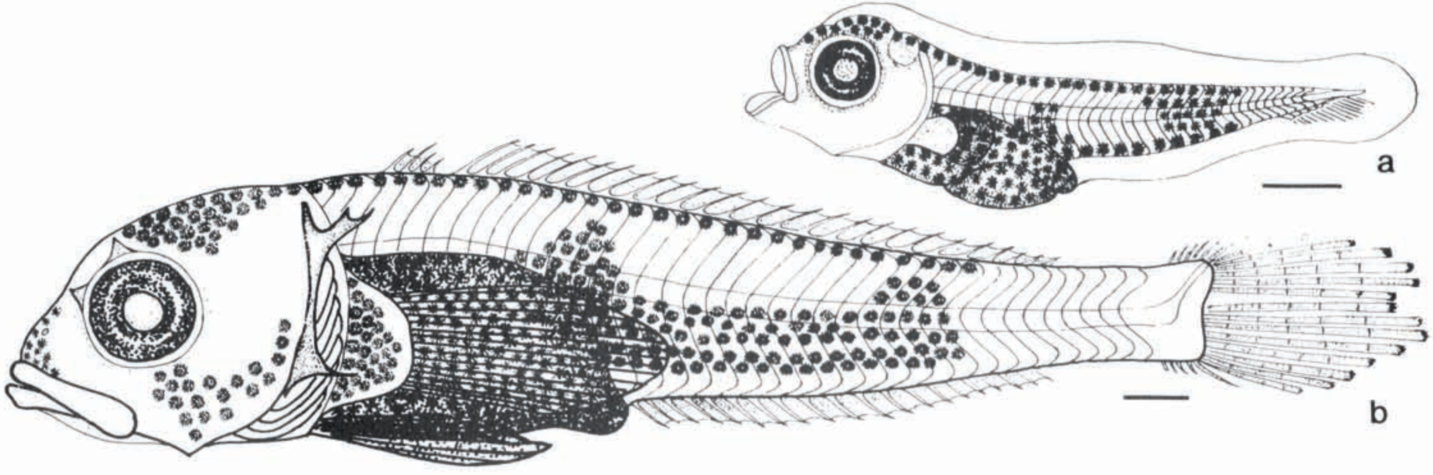

Fig. 23. – *Harpagifer bispinis* : a - 7.5 mm larva, b - 24.5 mm larva.

Aethotaxis mitopteryx De Witt, 1962, (Fig. 22)

Caught in the Scotia Sea off the South Shetland Islands in April.

A. mitopteryx, 38.5-43.3 mm (Fig. 22)

The body is not deep, slender. H:12.5-14.3 % SL. The head is small with an elongated pointed snout, HL: 25.5-26.5 % SL, pO :33.6-35.5 % HL. The gut is short, with a swollen mid-section. pA:47.5-49.5 % SL. The eyes are round, O :20.5-21.8 % HL. h : 6.8-8.2 % SL. The pectoral fin is blade-like. The larvae are heavily pigmented. There are subcaudal and dorsal rows of melanophores, melanophores on the gut and the head, and pigment cells on the base of the pectoral fin and at the base of the caudal fin rays. Pigment cells are scattered on the sides of the tail. The fin rays are completely formed. Total myotomes, 52-53; trunk myotomes, 18-20. D1:7-8, D2:32-33, A:31-32, P:27-28.

HARPAGIFERIDAE

The family Harpagiferidae is represented by larva of three species: *Harpagifer bispinis* (Schneider), *Pogonophryne marmorata* Norman and *Artedidraco mirus* Lönnberg.

Harpagifer bispinis (Schneider, 1801), (Fig. 23)

Caught in the Scotia Sea off South Georgia in September-April.(1)

H. bispinis, 7.8 mm (Fig. 23a)

The body is short, H: 11.8 % SL. The head is massive with a short snout, HL: 24.5 % SL, pO : 27.5 % HL. The gut is short, with a swollen mid-section. pA: 54.0 % SL. The body is fringed by a low embryonic fin fold. The head and gut are heavily pigmented, there are pigment concentrations on the sides of the tail. Total myotomes, 36; trunk myotomes, 12. Yolk sac is present.

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(1) A recent revision of the genus *Harpagifer* (Hureau *et al.*, 1980) has showed that *H. bispinis* is restricted to the southern regions of South America. The species known off South Georgia is *H. georgianus georgianus*. (Eds).

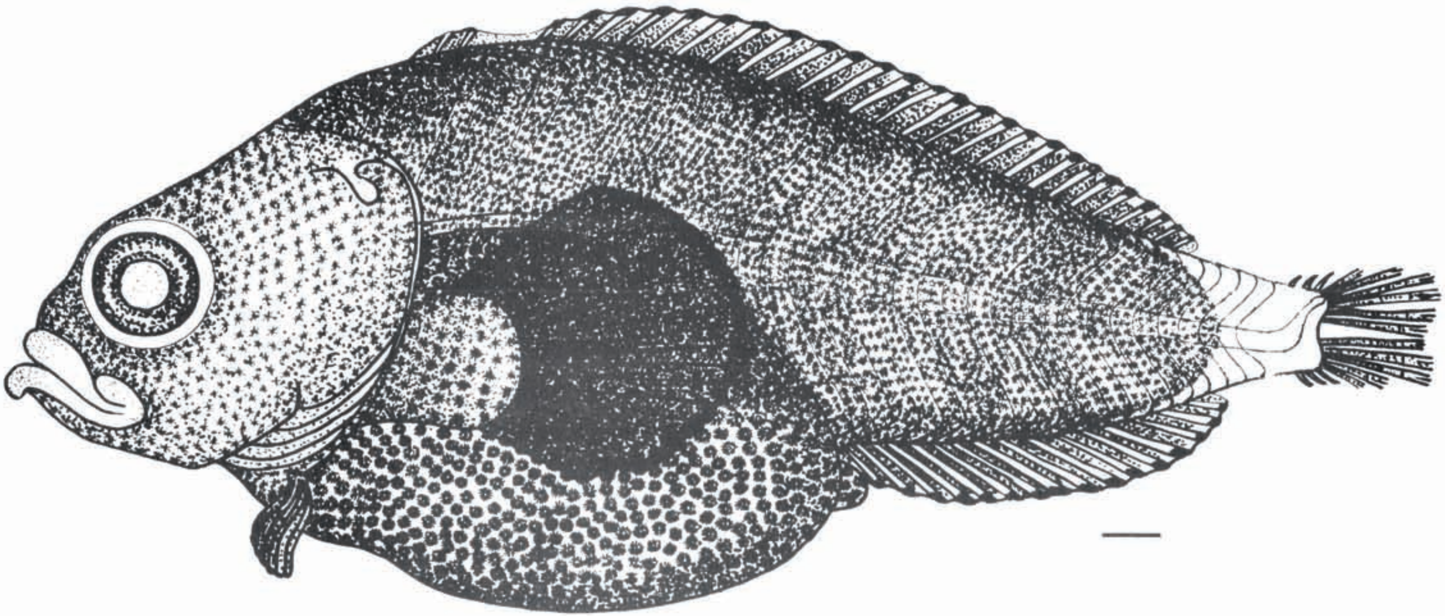

Fig. 24. – *Pogonophryne marmorata* : 25.5 mm larva.

Pogonophryne marmorata Norman, 1938, (Fig. 24)

Caught in the Scotia Sea off the South Orkney Islands in February.

P. marmorata, 25.5-32.5 mm (Fig. 24)

The body is short. H : 20.5-22.5 % SL. The head is massive with a short snout, HL : 32.8-33.5 % SL, pO : 22.5-23.5 % HL. The gut is relatively large, short, and has a rather swollen mid-section. pA : 63.5-65.5 % SL. The larvae are heavily pigmented. There is pigment on the head, body, tail and gut. The fin rays are fully formed, D1 : 2, D2 : 26, A : 18-19, P : 20. There is a short barbel on the lower jaw. Total myotomes, 37 ; trunk myotomes, 20.

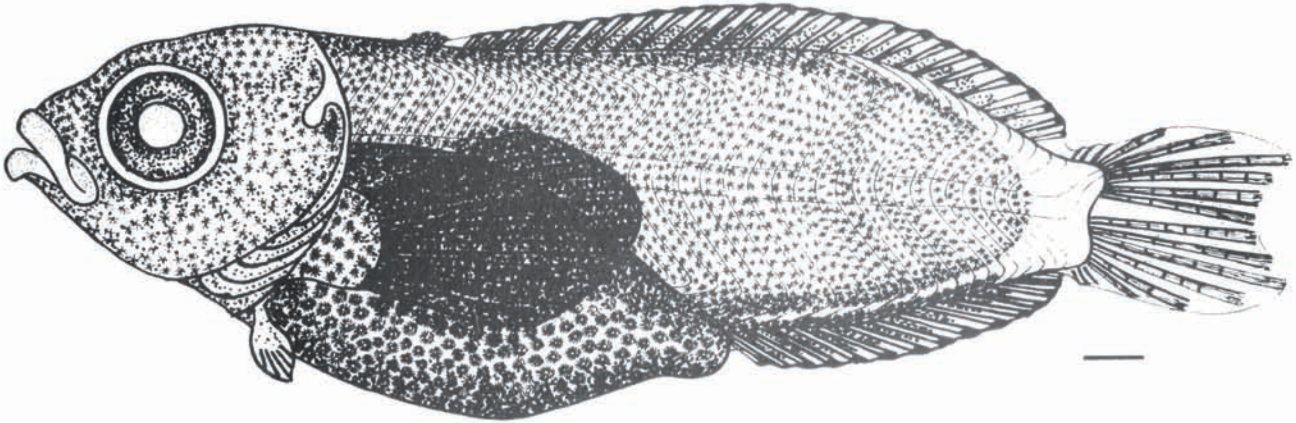

Fig. 25. – *Artedidraco mirus* : 24.0 mm larva.

H. bispinis, 24.5-27.0 mm (Fig. 23b)

The body is short. H:18.0-20.0 % SL. HL:28.5-29.8 % SL, pO:23.5-25.5 % SL. pA:50.5-51.5 % SL. The larvae are heavily pigmented, with pigment on the head, the gut and on the sides of the caudal region. The fin rays are completely formed. Total myotomes, 36-38; trunk myotomes, 12-14. D1: 3-4, D2: 21-26, A:16-21, P:16-18.

Artedidraco mirus **Lönnberg, 1905, (Fig. 25)**

Caught in the Scotia Sea off the South Orkney Islands in December.

A. mirus, 24.0 mm (Fig. 25)

The body is short. H : 23.5 % SL. The head is massive with a short snout, HL : 32.0 % SL, pO : 23.0 % HL. The gut is short and has a rather swollen mid-section. pA : 66.0 % SL. The larva is heavily pigmented. There is pigment on the head, body, tail and gut. The fin rays are completely formed. D1 : 4, D2 : 28, A : 18, P : 16. Total myotomes, 35 ; trunk myotomes, 18.

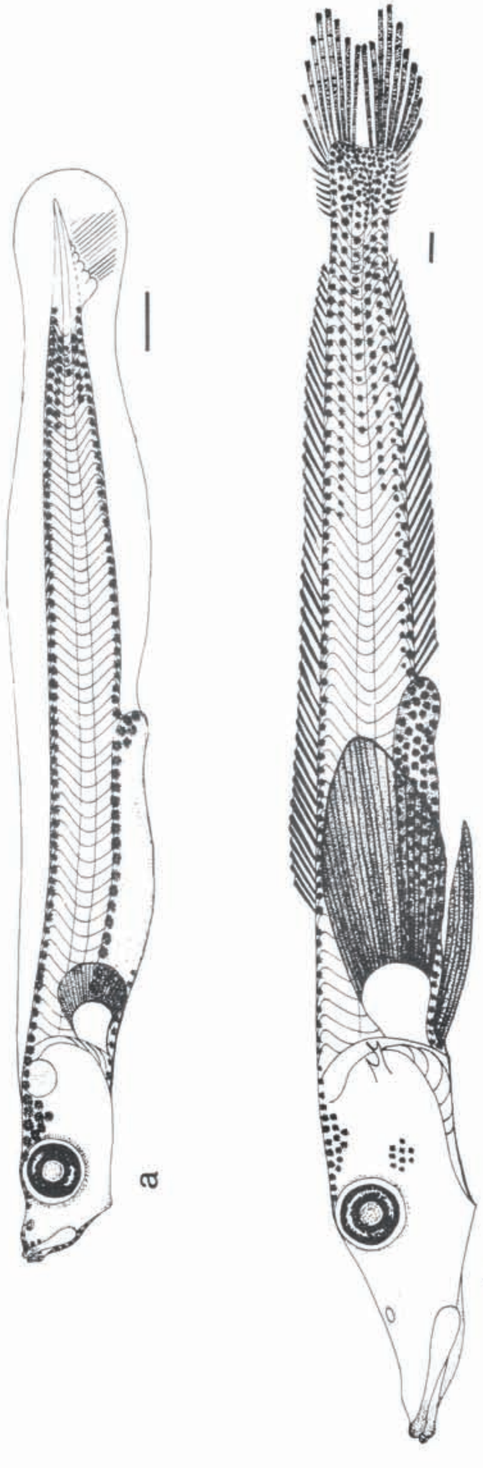

Fig. 26. – *Parachaenichthys georgianus* : a - 18.5 mm larva, b - 55.5 mm larva.

BATHYDRACONIDAE

The family Bathydraconidae is represented by three species: *Parachaenichthys georgianus* (Fisher), *Psilodraco breviceps* Norman, *Gymnodraco acuticeps* Boulenger.

Parachaenichthys georgianus (Fischer, 1885), (Fig. 26)

Caught in the Scotia Sea off South Georgia in August-January.

P. georgianus, 18.5 mm (Fig. 26a)

The body is slender, H : 10.0 % SL. The head has a pointed snout, HL : 23.5 % SL, pO : 28.5 % HL. The gut is long, shaped as a tube. pA:54.5 % SL. The eyes are round, O : 28.5 % HL. The pectoral fins are blade-like. The body is fringed by a low, embryonic fin fold. The larva is pigmented. There are subcaudal and dorsal rows of melanophores, pigment cells in the occipital region, on the snout end and the gut, and a concentration of pigment cells on the caudal peduncle. Total myotomes, 55; trunk myotomes, 25.

P. georgianus, 55.5 mm (Fig. 26b)

H : 8.5 % SL. The head has an elongated flattened snout, HL :32.0 % SL, pO : 42.5 % HL. pA:58.5 % SL. O : 16.8 % HL. The pigment pattern is unchanged. The fin rays are completely formed. D :45, A:31, P::23. Total myotomes, 55; trunk myotomes, 26.

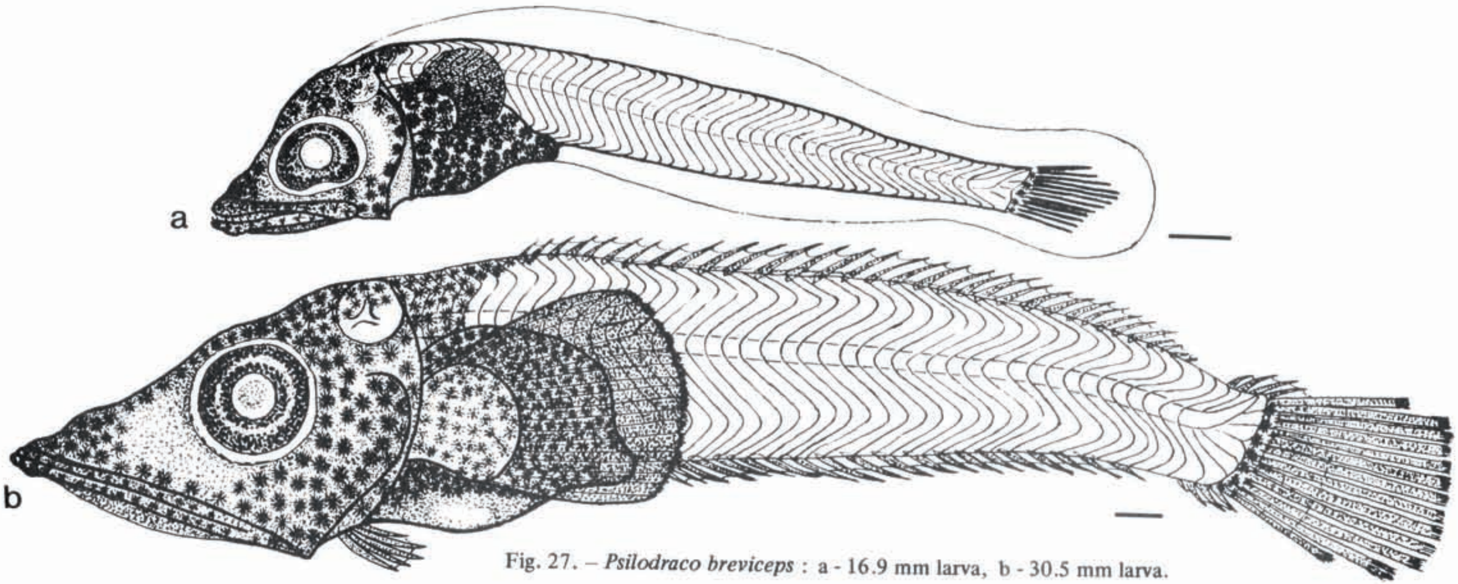

Fig. 27. – *Psilodraco breviceps* : a - 16.9 mm larva, b - 30.5 mm larva.

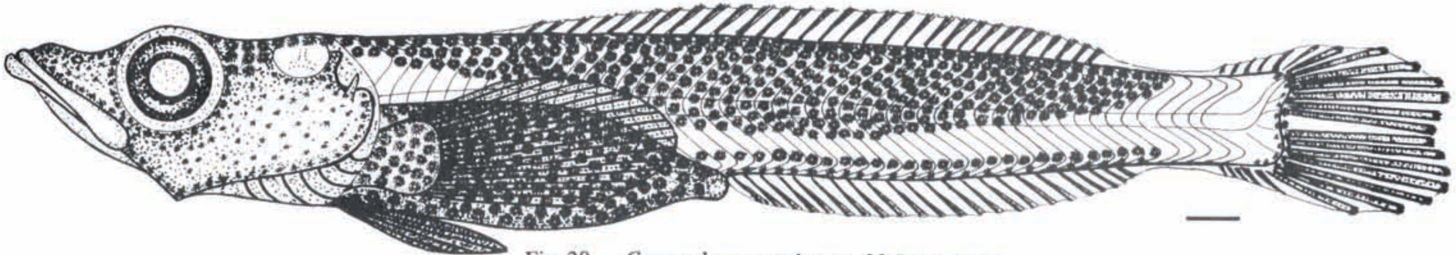

Fig. 28. – *Gymnodraco acuticeps* : 33.7 mm larva.

Psilodraco breviceps Norman, 1937, (Fig. 27)

Caught in the Scotia Sea off South Georgia in August-February.

P. breviceps, 16.9 mm (fig. 27a)

The body is not deep, slender, H : 11.0 % SL. The head is short with a pointed snout, HL:27.5 % SL, pO :37.5 % HL. The gut is short, with a swollen mid-section. pA:43.8 % SL. The eyes are round, O :37.5 % SL. The pectorals are blade-like. The body is fringed by a low embryonic fin fold. The head and the gut are heavily pigmented and there are pigment cells at the base of the caudal fin rays. Total myotomes, 48 ; trunk myotomes, 15. Rudimentary rays are present.

P. breviceps, 30.5 mm (Fig. 27b)

H : 17.5 % SL. The head is short with a pointed, flattened snout, HL:31,5 % SL, pO : 53.0 % HL. pA:50,0 % SL. The eyes are round, O :25.8 % HL. The pigment pattern is unchanged. The fin rays are fully formed. D :34, A :20, P:18. Total myotomes, 55 ; trunk myotomes, 16.

Gymnodraco acuticeps Boulenger, 1902 (Fig. 28)

Caught in the Scotia Sea off the South Shetland Islands in January.

G. acuticeps, 33.7-34.2 mm (Fig. 28)

The body is not deep, slender. H :11.5-12.2 % SL. The head has an elongated flattened snout, HL:30.0-30,5 % L, pO :33.5-34.5 % HL. The gut is short, with a swollen mid-section. pA:56.0-56.5 % SL. The eyes are round, O :27,5-28.0 % HL. The larvae are heavily pigmented. There is pigment on the head, gut, body and tail, a subcaudal row of melanophores, pigment cells at the base of the caudal fin rays. The fin rays are completely formed. D :28-30, A:24-26, P:21-22. Total myotomes, 50-52 ; trunk myotomes, 18-20.

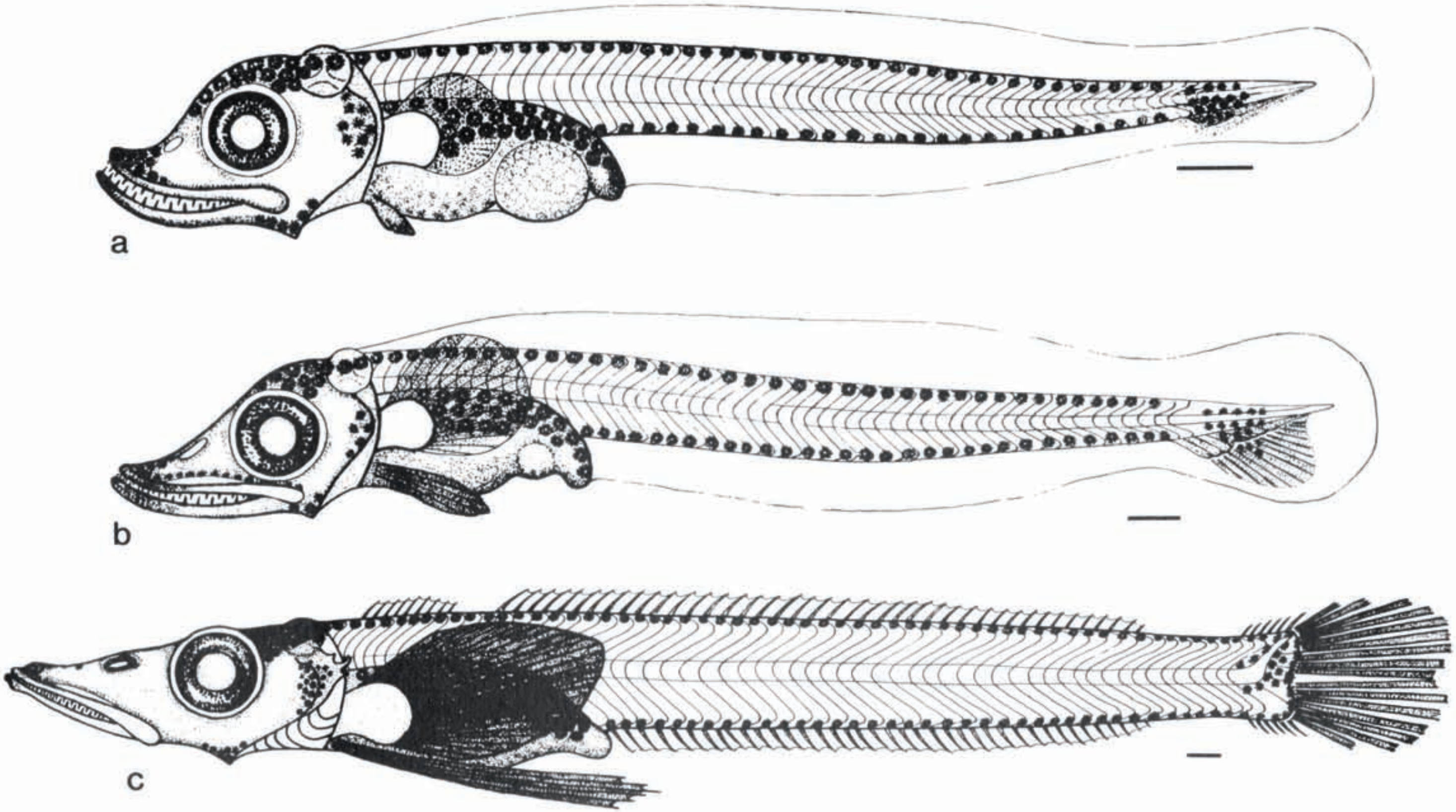

Fig. 29. – *Champsocephalus gunnari* : a - 15.0 mm larva, b - 23.5 mm larva, c - 47.5 mm larva.

CHANNICHTHYIDAE

The family Channichthyidae is represented by seven species : *Champsocephalus gunnari* Lönnberg, *Chaenocephalus aceratus* (Lönnberg), *Pseudochaenichthys georgianus* Norman, *Cryodraco antarcticus* Dollo, *Chionodraco hamatus* (Lönnberg), *Chaenodraco wilsoni* Regan and *Pagetopsis macropterus* Boulenger.

Champsocephalus gunnari **Lönnberg, 1905, (Fig. 29)**

Caught in the Scotia Sea off South Georgia and the South Orkney Islands in August-March.

C. gunnari, 12.5-15.3 mm (Fig. 29a)

The body is not deep, slender. H : 6.5-8.0 % SL. The head has an elongated flattened snout, HL:17.8-20.0 % SL, pO : 18.2-23.5 % HL. The gut is short, with a swollen mid-section. pA: 32.8-38.5 % SL. The eyes are round, O :35.5-40.0 % HL. The jaws are long, reaching behind the mid-eye, with numerous conical teeth. The pectoral is blade-like, set rather low, with a long base. h : 2.5-4.3 % SL. Yolk sac is present. The urostyle is straight. Pigmentation is represented by dorsal and subcaudal isomeric rows of melanophores, peritoneal and parietal concentrations of pigment cells, melanophores on the occipital region, on the snout end, the jaw and operculum edges, on the base of the pectoral fin, above and below the urostyle. The body is fringed by a low fin fold. Total myotomes, 60-61 ; trunk myotomes, 12-13.

C. gunnari, 21.8-25.3 mm (Fig. 29b)

H: 5.5-7.8 % SL. HL: 20.8-22.6 % SL, pO : 28.8-35.5 % HL. pA: 38.5-40.0 % SL. The eyes are round, O : 29,8-34.5 % HL. The jaws are long, reaching behind the mid-eye, with numerous conical teeth. h : 2.8-3.8 % SL. The urostyle is straight. Pigmentation pattern is unchanged. Total myotomes, 60-61 ; trunk myotomes, 15-16. The body is fringed by a low fin fold. There are rudimentary hypurals and rays in the caudal fin.

C. gunnari, 47.8-57.5 mm (Fig. 29c)

H : 8.8-10.4 % SL. HL:25.8-31.6 % SL, pO :41.7-45.2 % HL. The eyes are round, O : 20.2-21.3 % HL. pA: 44.0-51.0 % SL. The urostyle is upturned. Pigmentation pattern as for 21.8-25.3 mm specimens and pigment cells at the base of the caudal fin rays. The operculum has three spinous projections. Total myotomes, 60-62 ; trunk myotomes, 16-18. D1 :9-10, D2 :37-39, A:36-38, P:25-27.

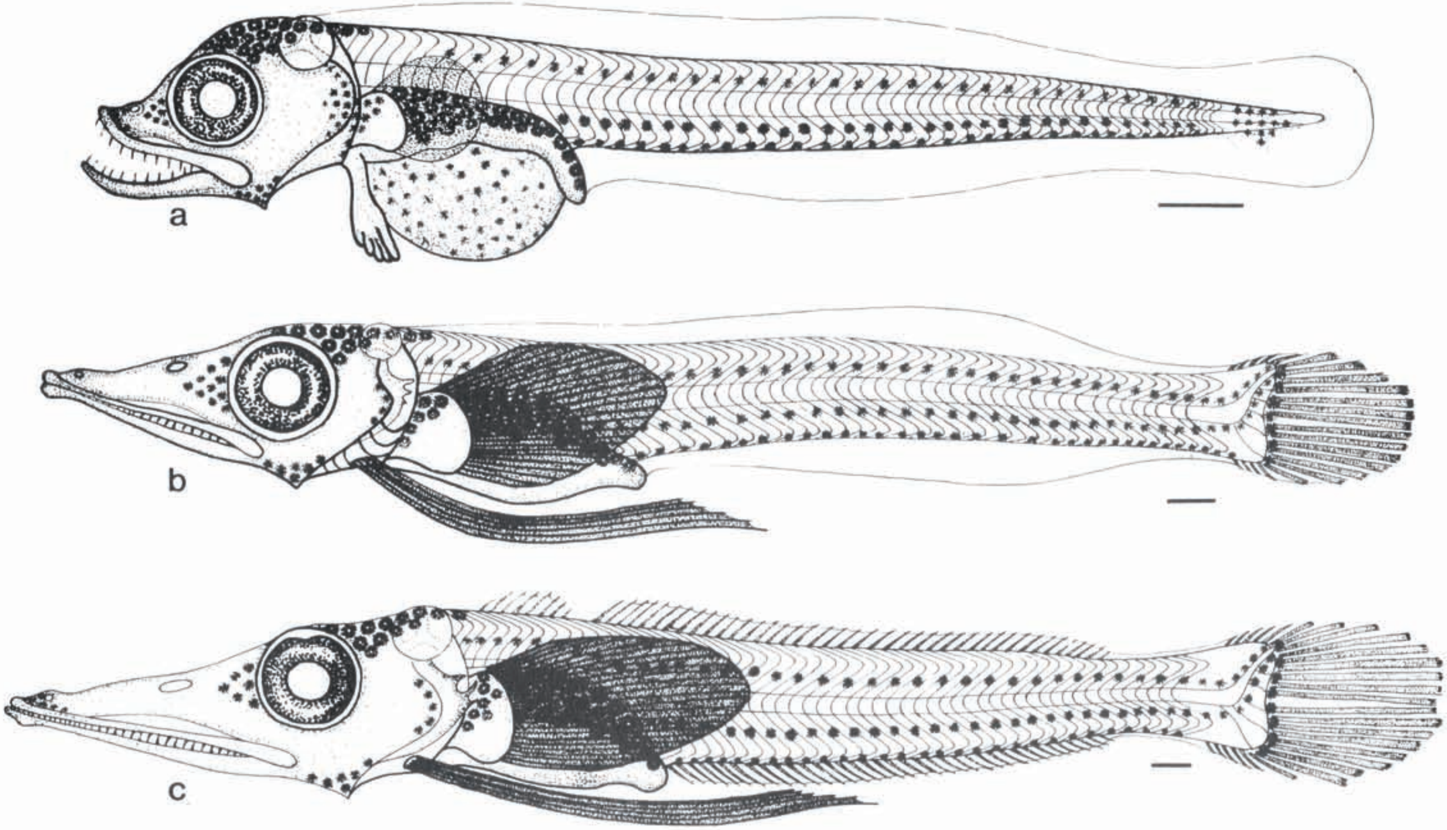

Fig. 30. – *Chaenocephalus aceratus* : a - 17.8 mm larva, b - 30.0 mm larva, c - 46.0 mm larva.

Chaenocephalus aceratus (Lönnberg, 1906), (Fig. 30)

Caught is the Scotia Sea off South Georgia and the South Orkney Islands in August-April.

C. aceratus 17.8-21.5 mm (Fig. 30a)

The body is not deep, slender. H: 5.7-6.8 % SL. The head is long with an elongated flattened snout, HL : 19.8-20.5 % SL, pO : 32.5-38.3 % HL. The gut is short, with a swollen mid-section. pA : 37.6-38.0 % SL. The eyes are round, O :28.0-35.5 % HL. The jows are long, reaching behind the mid-eye, and armed with numerous conical teeth. The ventral fins reach to mid-gut. The pectoral fin is blade - like with a long base. h : 2.4-2.8 % SL. Yolk sac is present. The urostyle is straight. The body is fringed by a low embryonic fin fold. Pigmentation consists of two lateral rows of pigment cells running parallel on either side of the body, pigment cells in the occipital region, on the snout end, on the edges of jaws and opercula. The ventral fin rays are pigmented. There is a concentration of small pigment cells below the urostyle and a subcaudal isomeric row of melanophores. Total myotomes, 60-62 ; trunk myotomes, 14-16.

C. aceratus, 30.0-36.3 mm (Fig. 30b)

H : 8.3-9.4 % SL. HL :26.8-28.6 % SL, pO : 47.2 % HL. pA :44.0-44.6 % SL. The eyes are round, O : 21.2-21.8 % HL. The ventral fin is relatively long, much longer than the pectoral. The body is fringed by a low fin fold. Pigmentation remains unchanged. There are three spinous projections on the operculum. Total myotomes, 60-62 ; trunk myotomes, 18-19. The urostyle is upturned.

C. aceratus, 46.0-73.5 mm (Fig. 30c)

H :8.0-11.3 % SL. HL:30.8-35.5 % SL, pO :48.4-54.5 % HL. pA:48.4-53.2 % SL. The eyes are round, O :16.7-20.7 % HL. h :4.7-6.6 % SL. The ventral fin is relatively long, much longer than the pectoral. Pigmentation consists of a subcaudal isomeric row of melanophores, two lateral rows, peritoneal and parietal concentrations of pigment cells. There are also concentrations of pigment cells in the occipital region, on the snout, on the edges of jaws and opercula and at the base of the caudal fin rays. The operculum has three spinous projections. Total myotomes, 61-62 ; trunk myotomes, 18-20. D1 : 7-8, D2 :38-40, A:37-39, P:25-26.

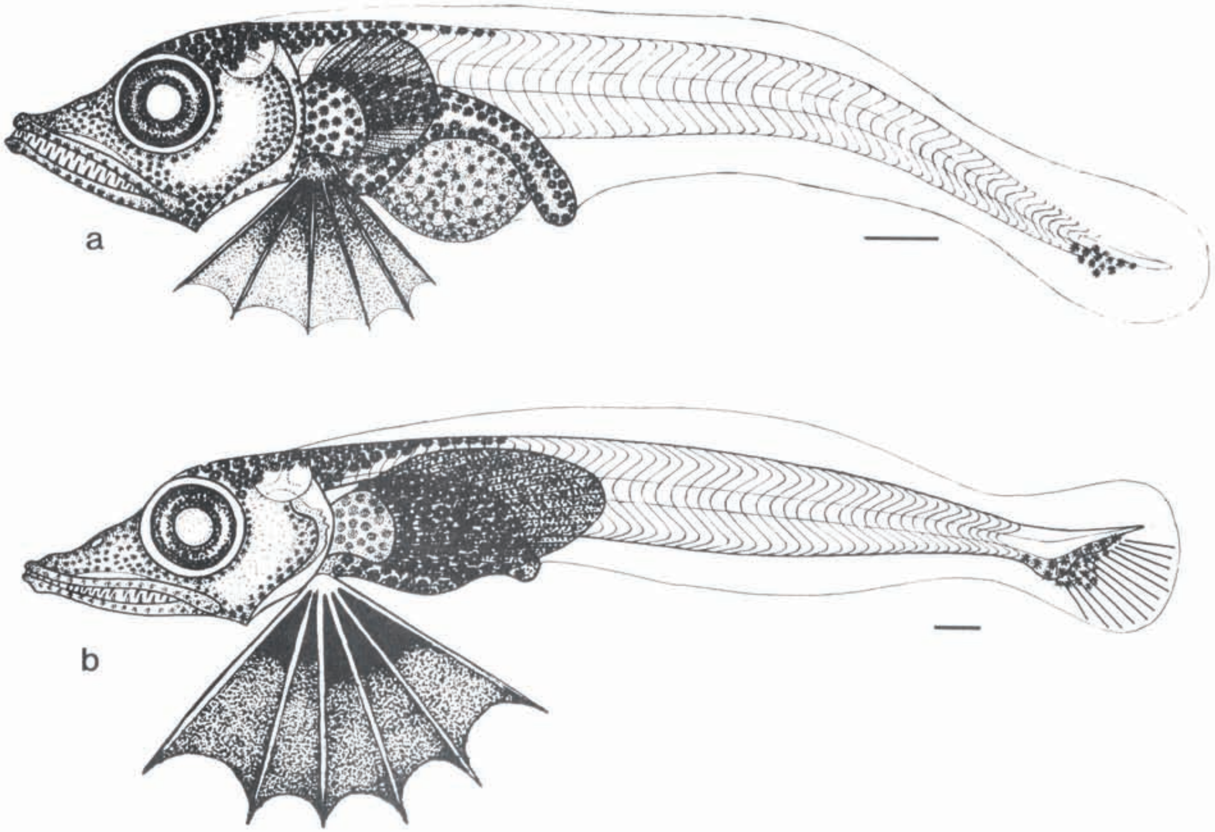

Fig. 31. – *Pseudochaenichthys georgianus* : a - 18.5 mm larva, b - 25.8 mm larva,

Pseudochaenichthys georgianus **Norman, 1937, (Fig. 31)**

Caught in the Scotia Sea off South Georgia and the South Orkney Islands in August-April.

P. georgianus, 18.5-20.5 mm (Fig. 31a)

The body is short and relatively deep as compared to other species. H : 7.5-8.4 % SL. The head is large with an elongated flattened snout, HL : 19.5-22.5 % SL, pO : 33.5-37.8 % HL. The gut is short, with a swollen mid-section. Yolk sac is present. pA : 42.5-43.2 % SL. The eyes are large and round, O : 32.3-34.5 % HL. The jaws are long, reaching behind the eye, armed with numerous conical teeth. The ventral fins are relatively long, reaching the anus. The pectoral is blade-like, set rather low. Pigmentation consists of an incomplete dorsal row of melanophores starting from the head and reaching the mid-gut level, concentrations of small pigment cells on the snout end, on the edges of jaws and opercula, on the base of the pectoral fin and below the urostyle. The ventral fin rays and the connective membrane between them are heavily pigmented, which makes the ventral fins look black, particularly at the base. Total myotomes, 52-54 ; trunk myotomes, 16-18. The body is fringed by a low embryonic fin fold.

P. georgianus, 25.8-27.7 mm (Fig. 31b)

H : 7.5-10.0 % SL. HL:18.9-30.7 % SL, pO : 33.3-51.5 % HL. pA : 42.5-49.3 % SL. O : 26.7-34.3 % HL. The jaws are long, reaching behind the eye. The pectoral fin is blade-like, set rather low. h : 2.8-4.4 % SL. Pigmentation consists of an incomplete dorsal row of melanophores starting from the head and reaching the anus level, peritoneal, parietal and occipital concentrations, concentrations of small pigment cells on the tip of the snout, on the edges of jaws and opercula, on the base of the pectoral fin, at the base of the caudal fin rays, above and below the urostyle. The ventral fin rays and connective membrane between them are heavily pigmented, which makes the ventral fin black. Total myotomes, 52-54 ; trunk myotomes, 16-18. The body is fringed by a low fin fold.

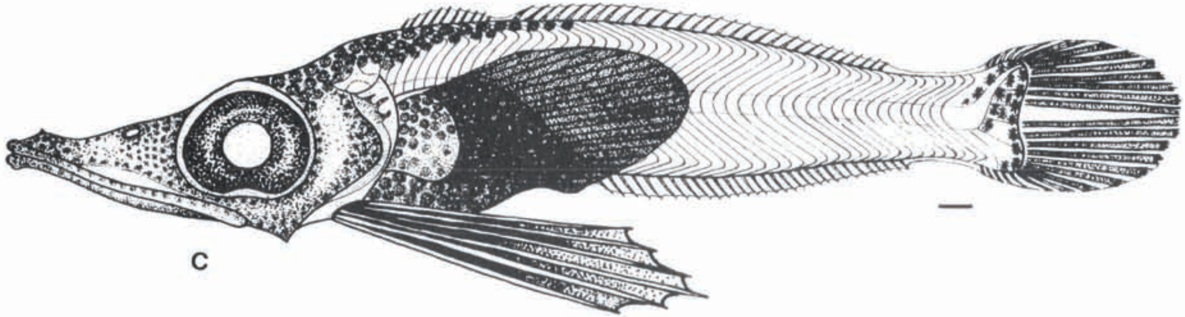

Fig. 31 c. – *Pseudochaenichthys georgianus* - 35.0 mm larva.

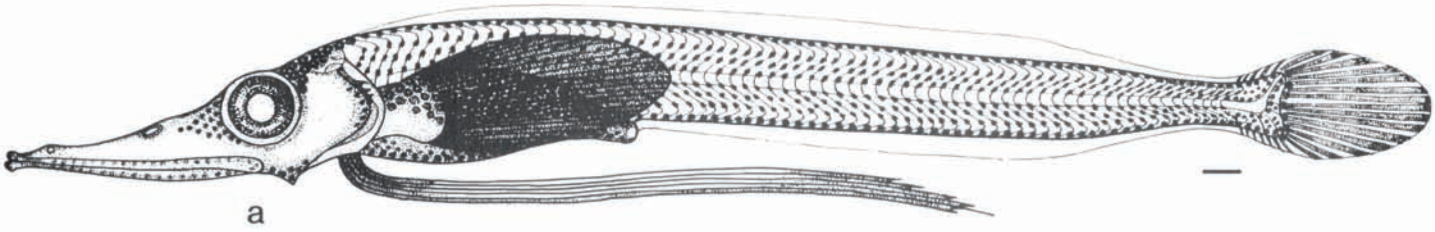

Fig. 32. – *Cryodraco antarcticus* : a - 34.6 mm larva,

P. georgianus, 33.0-54.5 mm (Fig. 31c)

H : 13.3-15.7 % SL. HL: 38.9-40.9 % SL, pO : 43.3-46.7 % HL. O : 19.3-22.4 % HL. pA: 52.9-58.8 % SL. The jaws are long, reaching behind mid-eye. The ventral fins are relatively long, nearly reaching the middle of the anal fin. The pectoral fin is blade-like with a long base. h : 6.5-7.2 % SL. The urostyle is upturned. The pigment pattern is as in 25.8-27.7 mm specimens, with the head heavily pigmented and with pigment cells on the end of the snout and on the edges of jaws and opercula. There is a rostral spine at the snout tip. The operculum has three spinous projections. Total myotomes, 52-54 ; trunk myotomes, 16-18. D1 : 8-10, D2 : 29-31, P : 23-24.

Cryodraco antarcticus **Dollo, 1900, (Fig. 32)**

Caught in the Scotia Sea off the South Orkney Islands in November-March.

C. antarcticus, 42.0-51.0 mm (Fig. 32a)

The body is relatively long and not deep, H : 8.0-0.8.7 % SL. The head is relatively long with an elongated and markedly flattened snout. HL: 26.1-29.9 % SL, pO : 53.6-60.0 % HL. The eyes are large and round, O : 16.7-17.8 % HL. The gut is short, with a swollen mid-section. pA: 47.8-54.7 % SL. The jaws are relatively long, reaching behind the mid-eye. The ventral fin is very long, 54.4-60.0 % SL. The pectoral fin is blade-like, set rather low, with a long base. h : 4.0-4.7 % SL. The urostyle is upturned. The body is fringed by a low fin fold. Pigmentation consists of a subcaudal isomeric row of melanophores and 4-5 lateral rows of small pigment cells running parallel on either side of the body, the pigment cells in the rows located on myosepta along the myotomes. There are peritoneal and parietal concentrations of melanophores and also concentrations in the occipital region, on the end of the snout, on the edges of jaws and opercula, on the base of the caudal fin, above and below the urostyle and at the base of the caudal fin rays. Total myotomes, 63-65 trunk myotomes, 18-20.

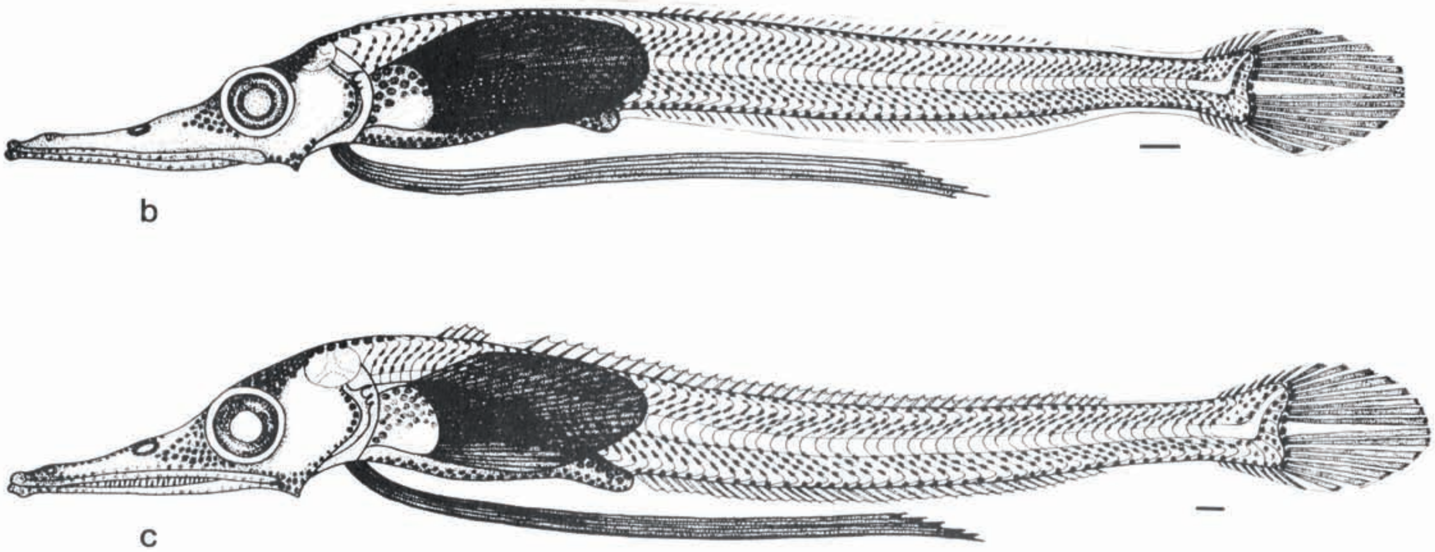

Fig. 32. – *Cryodraco antarcticus* : b - 42.5 mm larva, c - 57.5 mm larva.

C. antarcticus, 42.5-48.5 mm (Fig. 32b)

H :7.6-7.8 % SL. HL:18.5-20.5 % SL, pO :45.5-50.5 % HL. O :14.8-17.5 % HL. pA : 47.5-48.5 % SL. The ventral fin is long, reaching behind the mid-body. The pectoral fin is blade-like. h:3.8-4.6 % SL. Fin fold and urostyle are unchanged. Pigmentation remains unchanged. Total myotomes, 63-65 ; trunk myotomes, 18-20. There are rudimentary rays on the anal and dorsal fins.

C. antarcticus, 57.5-79.5 mm (Fig. 32c)

H :6.6-8.3 % SL. HL :23.6-28.7 % SL, pO :52.0-57.3 % HL. pA :44.8-51.5 % SL. The jaws are relatively long, reaching behind the mid-eye, armed with numerous conical teeth. The pectoral fin is blade-like, with a long base. The ventral fin is very long, 54.5-59.4 % SL. h : 3.5-4.9 % SL. Pigmentation remains unchanged. Total myotomes, 63-65 ; trunk myotomes, 20-22. D1 :3-5, D2 :40-44, A :42-46, P :23-25.

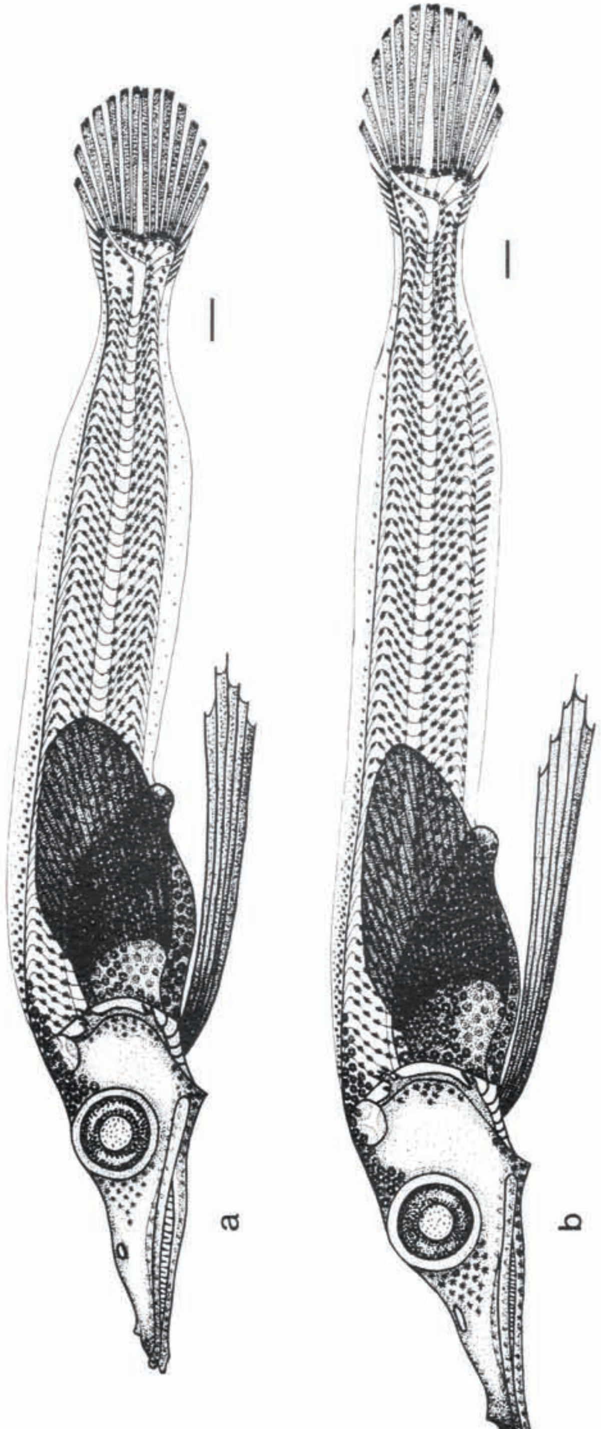

Fig. 33. – *Chionodraco hamatus* : a - 34.3 mm larva, b - 43.5 mm larva,

Chionodraco hamatus (Lönnberg, 1905), (Fig. 33)

Caught in the Scotia Sea off the South Orkney Islands and South Shetland Islands in December-March (1).

C. hamatus, 34.6-42.0 mm (Fig. 33a)

The body is slender, not deep. H : 7.8-8.8 % SL. The head is relatively large with an elongated flattened snout, HL : 26.8-34.3 % SL, pO : 47.7-54.7 % HL. The eyes are large and round, O : 20.9-24.4 % HL. The gut is short, with a swollen midsection. pA : 46.3-51.6 % SL. The jaws are relatively long, reaching behind the mideye. The ventral fins are long. The pectoral fin is blade-like, set rather low. h : 4.2-5.3 % SL. The body is fringed by a low embryonic fin fold. Pigmentation consists of a subcaudal and a dorsal isomeric rows of melanophores and 7-8 lateral rows of small pigment cells on either side of the body, with the pigment cells located on myosepta as if marking the myotome boundaries. There are parietal and peritoneal concentrations of pigment cells, concentrations on the snout end, on the edges of jaws and opercula, on the base of the pectoral fin, above and below the urostyle and at the base of the caudal fin rays. Total myotomes, 60-62 ; trunk myotomes, 16-18.

C. hamatus, 43.5-45.5 mm (Fig. 33b)

H : 8.3-8.5 % SL. HL : 25.5-25.8 % SL, pO : 52.5-54.5 % HL. The eyes are round, O : 21.2-22.0 % HL. pA : 44.5-46.5 % SL. h : 4.6-4.8 % SL. Pigmentation remains unchanged. Total myotomes, 60-62 ; trunk myotomes, 16-18. There are rudiments of rays in the anal fin. There is a rostral spine on the end of the snout.

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(1) In West Antarctica, *Chionodraco rastrospinosus* De Witt and Hureau 1979 is more common than *C. hamatus*, but at the larval stage it is impossible up to now to distinguish the two species. The adults differ only by the morphology of the branchiospines. (Ed.).

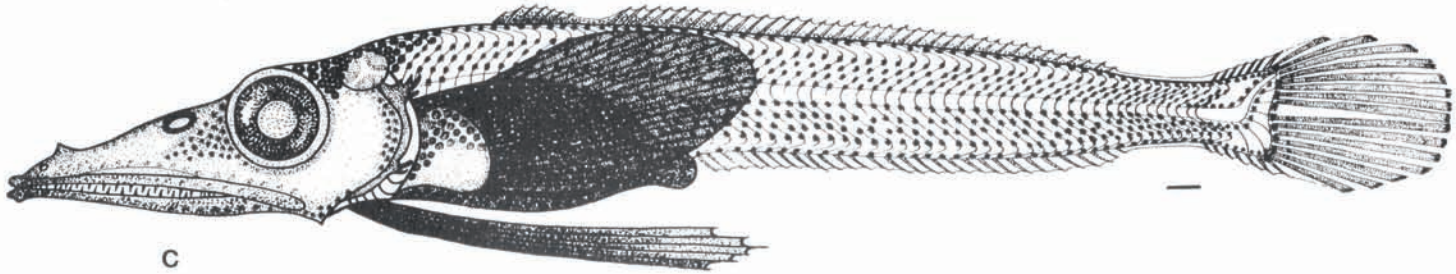

Fig. 33. – *Chionodraco hamatus* : c - 46.3 mm larva.

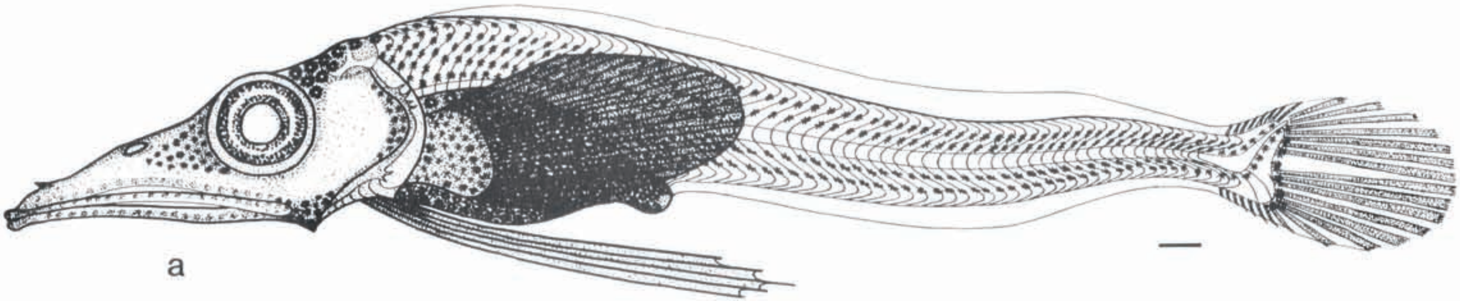

Fig. 34 – *Chaenodraco wilsoni* : a - 34.6 mm larva,

C. hamatus, 48.5-51.5 mm (Fig. 33c)

H : 10.1-10.6 % SL. HL : 33.7-34.8 % SL, pO : 50.7 % HL. O : 17.3-20.0 % HL. pA: 53.5-56.3 % SL. The jaws are relatively long, reaching behind the mid-eye. h : 5.2-5.4 % SL. The urostyle is upturned. Pigmentation pattern unchanged with pigment cells on the occipital region. Total myotomes, 60-62 ; trunk myotomes, 16-18. D1 :7, D2 :37, A:33-35, P :22-24.

***Chaenodraco wilsoni* Regan, 1914, (Fig. 34)**

Caught in the Scotia Sea off the South Orkney Islands and South Shetland Islands in December-March.

C. wilsoni, 34.3-40.8 mm (Fig. 34a)

The body is slender, not deep. H :7.3-8.2 % SL. The head is relatively large with an elongated flattened snout, HL : 29.7-33.4 % SL, pO : 50.8-54.9 % HL. The eyes are large and round, O :22.6-24.5 % HL. The gut is short, with a swollen mid-section (pear-like). pA : 46.6-53.4 % SL. The jaws are relatively long, reaching behind mid-eye. The ventral fin is long. The pectoral fin is blade-like, set rather low. h : 4.3-4.4 % SL. The urostyle is upturned. The body is fringed by a low, embryonic fin fold. Pigmentation consists of a subcaudal isomeric row of melanophores and four lateral rows of small pigment cells running parallel, two above and two below the vertebrae on either side of the body, the pigment cells arranged in rows along the myosepta. There is a parietal and a peritoneal region, on the end of the snout, on the base of the pectoral fin, above and below the urostyle and at the base of the caudal fin rays. Total myotomes, 60-62 ; trunk myotomes, 16-18. There are 5 rays in the ventral fin. There is a rostral spine on the end of the snout. The operculum has six spinous projections.

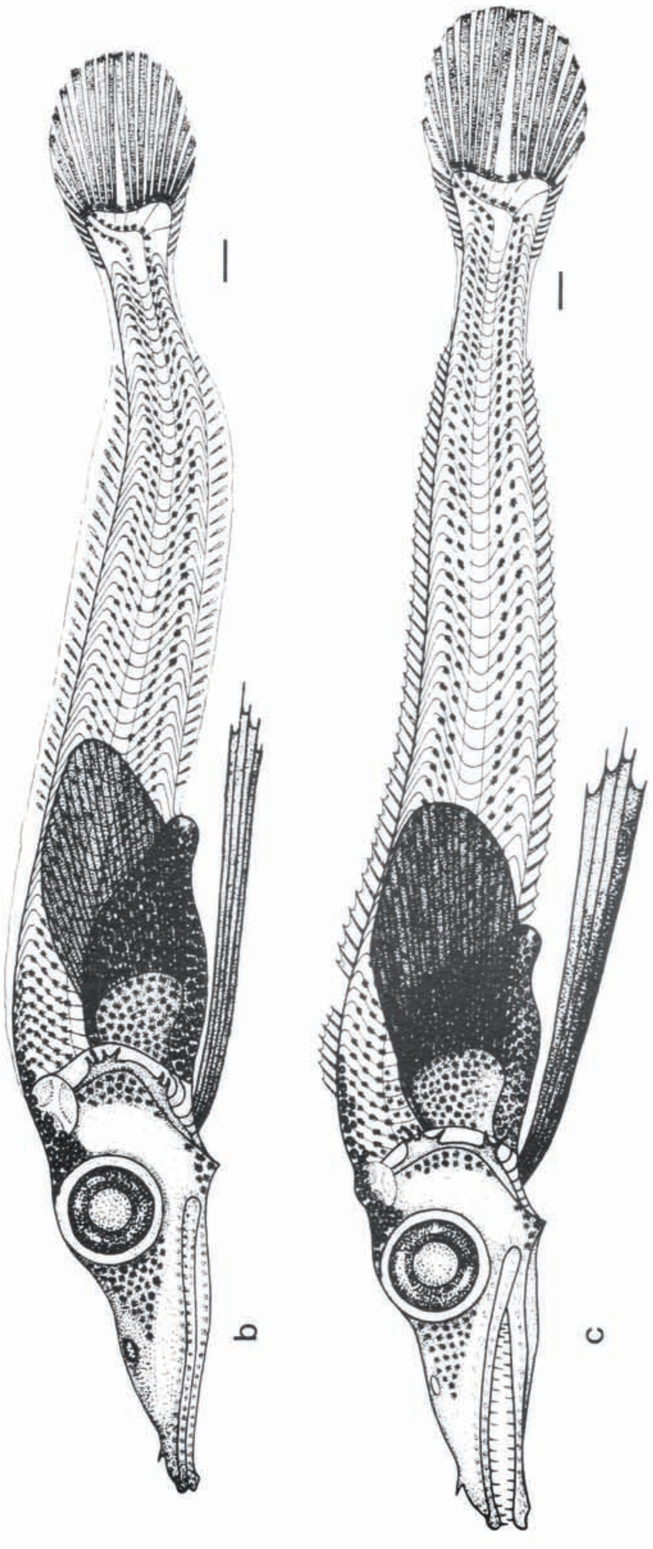

Fig. 34. – *Chaenodraco wilsoni* b - 43.5 mm larva. c – 48.5 mm larva.

C. wilsoni, 43.5-45.5 mm (Fig. 34b)

H:8.0-8.2 % SL. HL:23.5-25.5 % SL, pO:50.0-52.0 % HL. O:21.0-22.0 % HL. pA: 44.5-46.6 % SL. Pigmentation remains unchanged. Total myotomes, 60-63 ; trunk, 18-20. There are rudimentary rays in the anal and dorsal fins and 5 rays in the ventral fin.

C. wilsoni, 46.3-50.0 mm (Fig. 34c)

H:8.4-10.2 % SL. HL:29.9-32.6 % SL, pO:50.4-52.6 % HL. O:21.6-23.7 % HL. pA:49.7-51.8 % SL. The jaws are long, reaching behind the mid-eye, armed with numerous teeth. Pigmentation pattern is unchanged with pigment cells on the edges of jaws and opercula. Total myotomes, 60-62 ; trunk myotomes, 18-20. D1 :6.8, D2 :38-42, A:32-35, P :22-24, V:5. There is a rostral spine on the end of the snout and six spinous projections on the operculum.

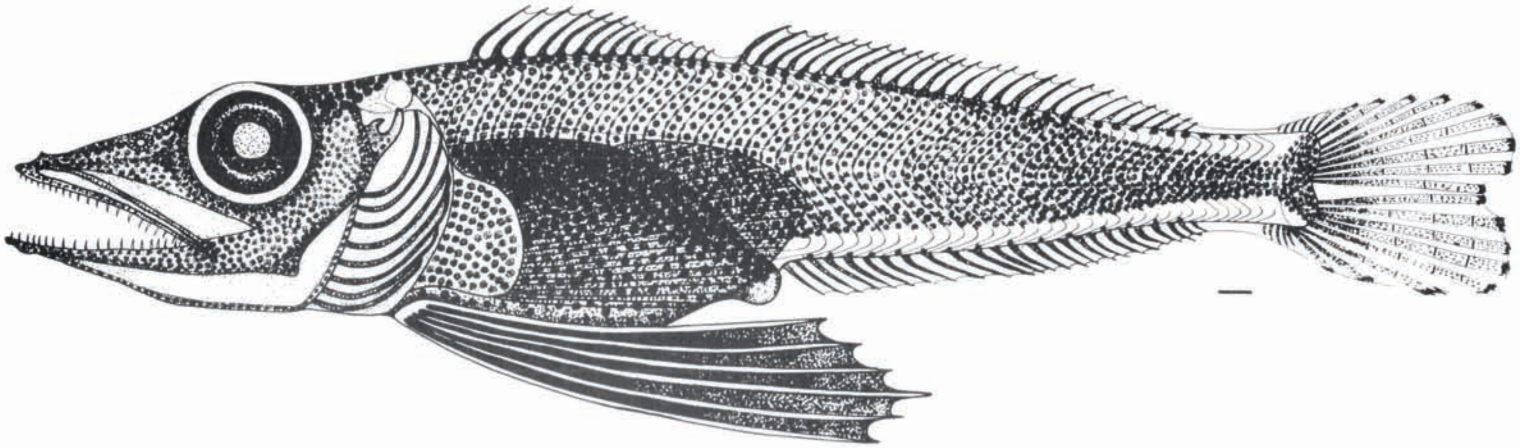

Fig. 35. – *Pagetopsis macropterus* : 54.5 mm larva.

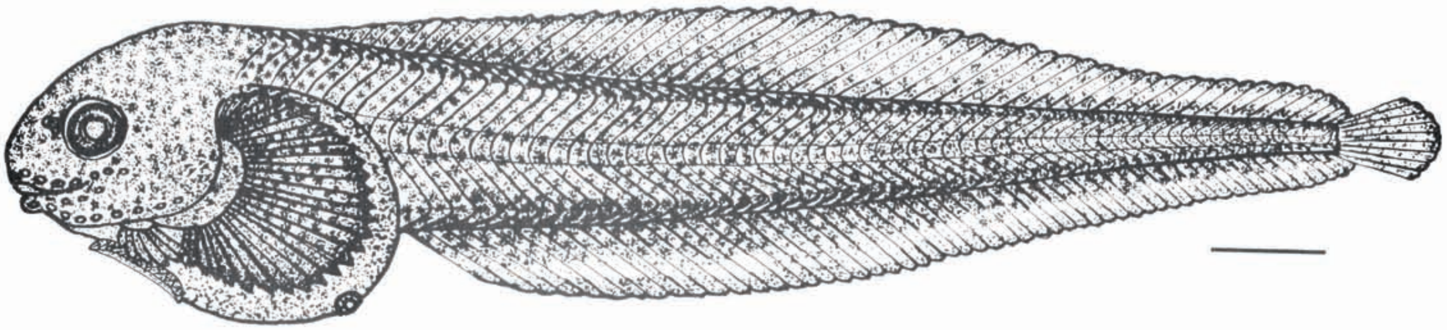

Fig. 36. – *Careproctus georgianus* : 12.5 mm larva.

Pagetopsis macropterus (Boulenger, 1907), (Fig. 35)

Caught in the Scotia Sea off the South Orkney Islands in February.

P. macropterus, 54.5-55.5 mm (Fig. 35)

The body is short and relatively deep, H: 12.0-12.5 % SL. The head is large with an elongated pointed snout, HL:36.0-36.5 % SL, pO :43.0-43.5 % HL. The gut is short, with a swollen mid-section. pA:58.5-60.5 % SL. The jaws are long, armed with conical teeth. The larvae have long, heavily pigmented ventral fins, much longer than the pectoral fins and reaching behind the anus. The pectoral fins are blade-like. h : 5.6-6.5 % SL. The urostyle is upturned. The larvae are heavily pigmented. There are pigment cells on the head, body and caudal region. The pigment cells on the body are located both on myotomes and the myosepta. There is a subcaudal and a dorsal row of melanophores, melanophores on the gut and on the base of the pectoral fin. The fin rays are completely formed. D1 : 12-15, D2 :27-31, A : 24-27, P : 22-23. Total myotomes, 56-58 ; trunk myotomes, 18-20. There is a rostral spine on the end of the snout.

LIPARIDAE

The family Liparidae is represented by one species, *Careproctus georgianus* Lönnberg (fig. 35), 12.5-14.5 mm in length, caught in the Scotia Sea off South Georgia in August.

Careproctus georgianus Lönnberg, 1905, (Fig. 35)

C. georgianus, 12.5-14.5 mm (Fig. 35)

The body is slender, not deep, H: 9.5-12.5 % SL. The head is small with a rounded snout, HL :18.5-20.5 % SL, pO : 24.5-29.5 % HL. The gut is short, with a swollen mid-section. pA:31.5-32.5 % SL. The eyes are round, O, 23.5-24.8 % HL. The larvae are heavily pigmented, with pigment on the head, body, gut and caudal region. Yolk sac is present. The fin rays are formed. D :54, A :46, P :24. Total myotomes, 56-58 ; trunk myotomes, 10-12. There is a pectoral suctorial disk.

Ecological aspects of the Ichtyoplankton from the Scotia Sea

In the Scotia Sea, the pelagic ichtyofauna is relatively rich with about 50 species recorded for the region, however data concerning the eggs and larval stages are rather limited. Collections have been made during the last fifteen years by the Soviet research ships and from these we can conclude that :

— the most frequently sampled eggs and larvae were those of eight species of the families Myctophidae (*Electrona antarctica, Krefftichthys anderssoni, Protomyctophum bolini, Gymnoscopelus braueri, G. nicholsi, G. opisthopterus)*, Bathylagidae (*Bathylagus antarcticus*) and Paralepididae *(Notolepis coatsi)*.

— these fishes spawn at a depth below 200 metres : all the eggs and pre-larvae of these pelagic species were collected between 1000 and 200 metres.

Larvae and post-larvae of these species were found throughout the year in the Scotia Sea but their vertical distribution depended on the season. At the end of autumn and winter, they were absent from the superficial waters (0-200 m) and were present in the warmer waters below 200 m ; on the other end in spring and summer they could also be found in the surface waters (0-100 m). The eggs and pre-larvae were found in aggregations associated with cyclonic currents that occur within the general circumantarctic water circulation.

The benthic notothenioid fishes (Nototheniidae, Channichthyidae, Bathydraconidae and Harpagiferidae) are more important than the pelagic fishes as exploitable marine resources. In this Atlas, the larval stages of 27 notothenioid species are described. All of these larval stages were found over the continental shelf between 0 and 200 m, and so have a different distribution pattern from the pelagic fishes.

It was observed that inter-species larval development was nearly synchronous, and this demonstrated that hatching occured at the same period for all the species, i.e. spring-summer. Spawning however can be classified into three groups :

1. Species spawning at the end of autumn or beginning of winter : *Champsocephalus gunnari, Chaenocephalus aceratus, Pseudochaenichthys georgianus, Cryodraco antarcticus, Chionodraco hamatus, Chaenodraco wilsoni, Notothenia rossii marmorata, N. coriiceps neglecta, Trematomus hansoni, T. eulepidotus, T. scotti, T. newnesi, Parachaenichthys georgianus* and *Psilodraco breviceps.*

2. Species spawning at the end of winter or beginning of spring : *Notothenia larseni, N. nudifrons, N. gibberifrons, N. angustifrons, Pleuragramma antarcticum* and *Harpagifer bispinis.*

3. and finally species spawning in spring or early summer : *Notothenia kempi, N. squamifrons atlantica* and *N. güntheri.*

Hatching always occurs in spring or summer, whatever spawning strategy a species exhibits. This observation means that the duration of development of the eggs varies from 1 to 5 months. When the embryonic development lasts 3 to 5 months, the eggs are larger (3.5 to 5.5 mm) than those having a short development (1 to 2 months, 1.6 to 2.5 mm). The pre-larvae that still have a yolksac are always small. The fish spawning in spring-early summer also have a short embryonic period and small eggs : the hatching occurs in this case at the end of summer.

In the vicinity of South Georgia Island, hatching generally occurs one month earlier than off South Orkney Islands and South Shetlan d Islands.

During the first weeks of the development, the larval stages do not migrate far from the spawning area and remain over the shelf. Oceanographic data have shown the presence of circular or cyclonic currents in the vicinity of all the island groups around the Scotia Sea. These currents concentrate the pre-larvae and larvae and maintain them in a favourable environment.

In some years, these cyclonic currents are absent and strong currents (for exemple around South Georgia Island) carry the larval stages away from the shelf to the open sea where their death occurs rapidly. These exceptional years cause disturbance in the recruitment of the main exploited fish populations. This problem has considerable consequences for fishery activities and must be studied very carefully.

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